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NOTES.

Reduced Charges for Guano.

It is notified that in future the charges for Government Guano on truck at Cape Town, for use within the limits of the Colony are to be reduced as follows :—*Ordinary Guano* from £6 10s. to £6 per ton of 2,000 lbs. or 12s. per bag of 200 lbs. *Rock Guano* from £6 17s. to £6 7s. per ton of 2,000 lbs. or 12s. 9d. per bag of 200 lbs. The reductions date from June 1st.

Kaalblad Prickly Pears.

Several correspondents have enquired lately for information on the Prickly Pear with the evident desire of cultivating the spineless—Kaalblad—variety. This variety has been successfully cultivated in the Botanic Gardens of Cape Town and Queenstown, but farmers who live in districts where prickly pear has become plentiful have assured us that one can never rely upon producing the spineless variety from seed. This plant makes such excellent stand-by fodder it seems a pity that someone does not go in for propagating the spineless variety with a view to its permanent establishment as a crop. The prickly variety could then be eradicated or fed off after singeing. Cattle and ostriches do so well on it that we could do with much of it in the dry districts if the spines could be dispensed with.

Nitro-Culture.

In connection with the bacterial fertiliser for leguminous crops of which a good deal has lately been heard in the public press we have pleasure in announcing that the Agricultural Department is carrying on experiments with a view to testing the practical value of this material. The necessary bacteria have been obtained from America for inoculating peas and beans and these are being artificially propagated in the bacteriological laboratory in order that supplies may be available for distribution. Small packets with full directions for use will be distributed to a limited number of farmers willing to assist the Department in its preliminary trial. These must be regarded purely as tentative, as it is too soon yet to undertake the matter on a commercial scale. Only those therefore who are willing to take some little trouble in the matter without prospect of immediate remuneration except in the form of information obtained need apply. At a later stage it is hoped to be able to experiment with the bacterial fertilisers for lucerne, vetches, clovers etc. In every case experimenters should examine the roots of peas and beans already growing, to ascertain whether or not the nodules, small lumps like tiny potatoes, are not already present on the roots, as it is a specially important point to ascertain whether it is any good to inoculate seed where the organism already is to be found. Applications should be addressed to the Agricultural Assistant, Department of Agriculture.

Cotton Growing.

With further reference to the trials of cotton-growing that are being initiated at the present time, we may call attention to the handsome prize of £30 offered by the Port Elizabeth Agricultural Society for "the best sample of Colonial grown cotton, not less than 100 lbs." This is a sum well worth competing for, and, in view of the numbers of applications for seed already received by the Agricultural Department, should bring out an interesting collection of samples from all parts of the colony. Other societies might with advantage offer awards for cotton grown in their own districts. It cannot yet be foreseen whether all the economic difficulties in the way of introducing cotton as a commercial crop can be overcome, but it is already apparent that over a wide area a genuine attempt to grow the crop is being made.

Dr. Purvis's Heartwater Vaccine.

Dr. Purvis has something to say in the correspondence this month with regard to our comments on his Heartwater Vaccine experiments. It is evidently very difficult to please Dr. Purvis. He is an enthusiast in his belief in inoculation for the prevention of Heartwater; and, naturally, has the greatest faith in his own particular method. We offered nothing beyond an opinion as to the result of the experiments mentioned; and surely it is our duty to express an opinion, if we hold it, even though that opinion may be in opposition to views held by Dr. Purvis. In this case, however, no hostility was either intended or expressed. We simply registered the Scottish verdict of "Not proven." Dr. Purvis's attitude all through is not a little puzzling. He claims to possess a proved, specific preventive for the disease known as Heartwater in sheep and goats. He says over two thousand sheep have been successfully inoculated. Yet, he resents a remark that one experiment has not returned a decisive verdict. When he can obtain positive results on a large scale, why waste his time over further experiments? As we have previously pointed out, there is nothing to prevent him inoculating all the sheep in the country; he has only to come to terms with the farmers. Controversy has little value beside positive results, for when such a remedy is proved, it has passed the experimental stage. But there should always be room for two opinions. Dr. Purvis believes firmly in his inoculation methods as a preventive; others prefer attacking the proved medium of transmission—the tick. That is where the whole case stands, and that is where it should be left. Each should work in his own way, and let the results speak for themselves.

Colonial Butter in London.

Following the example set by the Royal Horticultural Society in connection with Colonial fruit, the British Dairy Farmers' Association is arranging for exhibits of Colonial butter at the next Dairy Show in the Agricultural Hall, London, to be held early in October. The following classes will be provided for Colonial Butter, open to makers only:—

CLASS A.—SALT BUTTER. One Box containing not less than 56 lbs.

Entry Fee, 10s.

First Prize	Silver Medal and £5.
Second Prize	Bronze Medal and £3.
Third Prize	£2.

CLASS B.—FRESH BUTTER. One Box containing not less than 56 lbs.

Entry Fee, 10s.

First Prize	Silver Medal and £5.
Second Prize	Bronze Medal and £3.
Third Prize	£2.

The official numbers and labels for entries in these classes will be forwarded to authorised English agents of the Exhibitors. Entries close Monday, September 4th; or, with an additional fee of 50 per cent. at noon on Friday, September 8th. Mr. William C. Young is the Secretary, his address being 12, Hanover Square, London W. Should any of our butter-makers wish to compete, entry forms can be obtained on written application to the Editor of the *Agricultural Journal.*

Abscesses in the Lungs of Sheep.

The Colonial Veterinary Surgeon writing in answer to a correspondent who enquires about abscesses in the lungs of sheep, he having lost some from that cause, says:—Internal abscesses are very frequently due to the absorption of putrid or purulent matter from wounds or festering sores on the surface of the body. The matter is absorbed by the lymphatics, and the glands in their course become inflamed, swollen, and form into abscesses, just as a man with a festering sore about his hand very soon feels the glands in the armpit or axilla swollen and painful, and if the sore is neglected, the inflammation in the glands will go on to the formation of abscesses. A similar condition is observed when the tails of cattle swell after inoculation for lung-sickness. The glands at the root of the tail swell, and ultimately matter forms unless the diseased portion of the tail is cut off. A more striking example is seen in what is termed "Bastard Strangles" of the horse. In ordinary Strangles, the abscess usually forms between the branches of the lower jaw, but in some cases this abscess does not ripen properly, and discharge its contents; or the horse may be standing in a dirty stable, and little attention given to cleaning out the matter after the abscess opens, hence putrid matter collects in the wound and is absorbed, causing secondary abscesses to form all over the body externally and internally. In like manner sheep often receive wounds while being shorn, which, when not dressed at the time, form festering sores. Foot rot also may be prevalent in a flock of sheep, and if neglected, matter forms round the hoofs. A similar condition often follows the Malarial Fever of Sheep. It will be readily understood, therefore, that any wound on the surface of the body that takes on putrid action is liable to cause inflammation of the lymphatic glands leading from it, terminating in the formation of abscesses. I must not omit to point out another source of abscesses in the lungs of sheep, and that is standing in wet kraals up to their knees in cold, stormy weather. This causes inflammation of certain lobes of the lungs, which tends to go on to the formation of matter. In these situations, where they are surrounded by soft tissues the abscesses do not usually open, hence after the inflammation has subsided the fluid portion of the matter becomes gradually absorbed, leaving a thick cheesy-looking substance behind, called "inspissated pus." The treatment of disease of the lungs must be principally *preventive*, which will be clearly indicated by what I have described as the several causes. The curative treatment of all chest affections consists principally in comfort, nourishing food and pure fresh air. Very little can be done for such cases by the administration of medicine."

Show of Colonial-grown Fruit in London.

The Royal Horticultural Society (England) has decided to hold four further shows of Colonial fruits in London. The first is to be held on December 5, 1905, next, and the other three in March, May and December, 1906. The exact dates of next year's shows will be announced later. Besides fruits, the Society will be glad to welcome displays of indigenous plants and flowers of the Colonies, and other objects of interest and instruction bearing on their horticulture. As there is plenty of time for these shows we trust that our fruit-growers and all interested in horticulture in the Colony will make an effort to help towards securing a really representative exhibit. December may not be so well suited to South Africa, but later on should be more favourable. The opportunity of advertising our wares should undoubtedly be made the most of. We are informed that although the exhibits at the last show, especially the grapes, were in some respects disappointing, many inquiries have already been received by the Agent-General's Office and the Commercial Agent in London, in regard to Cape fruit. This is distinctly encouraging, and the success so far attained should be followed up.

Internal Parasites of Stock.

One of the commonest troubles our stock-farmers have to contend against is that of internal parasites, and the following is but a type of many letters we are constantly receiving:—"I am very much troubled with wire-worms in my sheep and lambs, and tapeworms in lambs and calves. I am continually dosing these, and apparently remove the worms each time (this more especially in the case of wire-worm); but after a few months the sheep again become infested. It appears to me that my farm is badly infected with these worms, and, although dosing frees the sheep for a time, they do not derive any lasting benefit. Could you kindly obtain some advice for me on the subject, as to either ridding the farm of this plague, or some preventive. I may add that my stock have had a regular supply ot salt during the last year, besides licks of lime and salt (one of lime to six of salt) at different times. With regard to tapeworms, although these are very troublesome in lambs and calves; by continued dosing they are got rid of."

Our correspondent has just hit the right nail on the head. Farms do get infected with these parasites, and it is not to be wondered when one gives the question a moment's serious thought. For years now the Colonial Veterinary Surgeon has been urging the seriousness of this view on all stock farmers. In 1899, when writing on the subject, he said:—"The prevalence of internal parasites amongst all kinds of stock, is becoming a very serious question. Fully 80 per cent. of the losses which occur amongst ostriches are due to parasites; in like manner internal and external parasites are accountable for a larger percentage of the losses which occur amongst sheep and goats annually, than all the other diseases to which they are liable put together. Similar remarks apply to goats, calves and pigs. The question is, however, how can the losses arising from these parasitic pests be prevented?

"The farmers generally demand a remedy which will eventually kill and expel these parasites from their respective hosts with once dosing, but although considerable progess has been made in our knowledge of such curative remedies, the fact is beginning to be realized by many of the farmers that it is practically impossible to free stock completely from internal parasites by curative medicine alone, however effective such medicaments may be, while the infected stock are allowed to remain on the same contaminated pasture.

"A change to clean veld becomes necessary after dosing, even when the latter is effective, before one can expect such infected stock to remain free from parasites for any length of time, and this can only be efficiently carried out when there are separate camps for each class of stock to admit of an interchange of pasture.

"Such an arrangement is equally advantageous when you have to deal with other contagious diseases besides parasites. Rotation of grazing is just as necessary and advantageous to the stock and to the pasture, as rotation in agriculture is advantageous to the crops and to the land; while every stock-farmer will recognise the advantage of being able to keep stock of different ages and description in separate flocks. There are other great advantages in having a farm divided into a number of camps of convenient size; the stock would not have to travel so far in search of their food, and consequently would not unnecessarily waste so much of their animal tissues. They would also learn to graze more leisurely, the manure would be spread evenly over the veld, and the latter would be improved instead of being tramped out as at present.

"With respect to the water generally supplied to stock, there can be little doubt that dam water, containing as it does the washing of the excrementitious matter deposited by the stock on the surface of the veld, in addition to the amount daily deposited by them when they come to drink, must become the breeding place of a large number of animal parasites, and one of the principal sources of infection. I anticipate, therefore, that before many years spring water will largely replace surface water for stock, and the use of the latter will be confined mainly to the irrigation of cultivated lands. In this connection it is very gratifying to observe the success which has attended the boring operations undertaken by the Government, and the eagerness with which the farmers have availed themselves of that means of securing a permanent supply of uncontaminated water for their stock. I am aware that stock generally prefer rain water to spring water, but they soon get accustomed to the latter."

The Cape Agricultural Union.

The Cape Agricultural Union formed last month (writes Mr. C. G. Lee) is an organization drawing together producers of all kinds of Colonial products, and is also a medium through which the farmer can get into more direct touch with a large section of townsmen, who should be consumers of Colonial products. The Union has room for every Fruit Growers' Association, Horticultural Society, Farmers' Association, and every other non-party-political Agricultural Association, including the Agricultural Societies, holding Agricultural Shows in the Towns, which are composed largely of townsmen who materially assist agriculture through the Shows. The Union's round table provides a meeting place where the farmer (the producer) can meet the townsman (the consumer) to devise means for mutual benefit.

One reason for this Union's formation (he continues) is the low price paid for Colonial produce by the middle-man and the high prices he charges the consumer for the same article. So high is the price that the Colonial grown necessities of life are driven out of our markets and imported food is sold in its stead, thereby placing the Cape Farmer in a dangerous position. The writer has no intention to lay all the blame for this state of things at the door of the middleman. It is well-known that he is more or less compelled to deal in imported goods because of the fluctuation in the quantity, want of uniformity of quality and irregularity in delivery of the Colonial article when compared with imported products of the same description. The fluctuation in quantity, is due partly to the low prices paid to the producer, who finds it altogether unprofitable to continue supplying when the cost of production is sent up, by unfavourable circumstances such as want of seasonable rains etc.

Touching the want of uniformity in quality. It can be confidently asserted that our land and climate are both rich and healthy, our producers are capable enough to give the consumer the very best quality, but this being a country of long distances, suitable conveyance of produce is absolutely necessary if perishables, including slaughter stock, are to be put down at the selling point without loss in quality. This suitable means of transit, we have not at present, hence there is much loss in quality. Further, many producers lack the opportunity of learning how to grow, sort, or pack, their produce. Thereby the quality is also affected. Other forces are operating detrimentally on the quality, but all are within the reach of remedy. To generalize upon a subject of this nature is, of course, dangerous. One may easily be misunderstood. Much Colonial produce ef undoubted uniform quality is regularly supplied by many of our producers, yet the immense imports of food stuffs which we could grow here, proves that the present supply is totally inadequate.

All must admit that the fluctuation in quantity, want of uniformity in quality, and irregularity of delivery must be overcome, for they seriously injure the Colonial producer, and give the middleman a reasonable excuse to deal in imported agricultural and pastoral produce. So long as the producers remain in their present disunited state, just so long are they leaving open a door wide enough for all necessities of life to be imported, and the consequent capturing of all our markets, Although it is beyond the province of this letter to prove how this Union can be used as the means to secure more regular delivery of uniform quality in Colonial-grown necessities of life, I would ask all interested to remember that this Cape Agricultural Union is the meeting place for the fruit-growers, the dairymen, the mutton, beef, and pork producer, the poultry and egg raiser, and the market gardener. These all have one common object, and there is, therefore, the more reason for their combined action. Each of these five classes of producers need regular, cheap, quick, and suitable railway transit from their nearest station to the best market, where they all require chilling chamber depôts and suitable accommodation in which to exhibit their goods for sale. The first step is to secure united action. This can be done by all Associations or Societies interested in agricultural or pastoral pursuits joining the

Cape Agricultural Union, and it is well to remember that the Cape Union is affiliated with similar Unions in each of the five South African Colonies, thereby giving each farmer a voice to speak for his best agricultural interest, not only in the Cape, but in the whole of South Africa.

Plants fitted for Sluit Stopping.

Mr. W. Roe, of Graaff-Reinet, writes:—In the May *Agricultural Journal,* Mr. French advocates a grass of his district (Maclear) that bears heavy feeding down, and pushes its way into bare footpaths. These are good points. The ideal sluit stopper seems to me a strong-growing grass, not too much relished by stock, yet good food, a good rooter well supplied with side shoots under ground, and bearing also cropping, when required for food. Obviously, if *too much relished* by stock, its value as a sluit stopper and filler will be diminished. It must be tough, yet bendable; when the sluit comes down holding its own until the storm passes. A grass, called Buffles Grass, growing in Basutoland and Barberton way, seems well capable of filling these demands—fine cattle food, but not affected by close-cropping, spreading side-ways by root system, as well as seeding when chance offers; but the root habit is the valuable one for this purpose of sluit stopping. I have watched it growing under very variable circumstances, holding on well, when dry, making good use of water, when it comes. It is grown as an ornamental plant here in Graaff-Reinet, and I have sent many plants out to farmers to try it under varied conditions.

Trees, however desirable are not to be had in most cases. In the plains they may be used, but on steep hill sides, dry and cut up, trees are impracticable and too slow growing. Good work is done with the Agave, a fair rooter, with side growth habit, but too firm and rigid for standing the push of the water, if place is steep. Buffles grass is tougher and a fine rooter. We want all, and more—the sluit evil is a terrible one in so large a portion of the Midlands. I have seen fine use made of the slabs of mest, from an old kraal—a deep sluit filled in with the slabs set in, sloping up stream. It is astonishing what a force of water, such dam will bear over it, and after the water passes, it cements itself together ready for the next attack. Stop the sluits, and feed back the good stuff the kraaling system has robbed the veld of. At the same time I enclose a strip of leaf and flower stem of the plant I have spoken of as Buffles grass as I believe there are several sorts called by that name.

The Fruit Growers' Congress.

The photograph of the delegates to the United Vine and Fruit Growers' Congress at Oudtshoorn, reproduced in this issue was taken by Mr. Stremmer, photographer of that town by whose kind permission it is published.

FARM AND VELD.

Inspection of Citrus Orchards in Oudtshoorn.

In continuation of the work of the Citrus Commission, Mr. P. J. Cillie recently visited 29 different citrus growers on their farms in the Oudtshoorn district, and reports:—I have taken the several wards in the district, and selected some of the biggest growers of citrus fruits in every ward. I also revisited some of the farms that were inspected in September, 1903, by the Citrus Commission, to see what headway Mal-di-goma had made in orchards infected, and if any of the instructions and recommendations given at that time have been followed up. I am most pleased to state that in several instances the recommendations have been followed up with admirable results, the most striking instance being on the farm of Mr. Hendrik Geyzer, P.O. Schoemanshoek, where, at the inspection in 1903, an orchard of very old orange and naartje trees was found to be badly infected by the Mal-di-goma. The owner was on the point of cutting down the whole orchard, and had actually chopped down 4 or 5 trees, when he, on the advice of the Commission, opened the roots, and cut away the diseased parts, with the remarkable result that the whole orchard has wonderfully recovered, and has now a fairly good crop of fine naartjes and oranges. This is certainly one of the most striking instances that the æration of the roots is not only a sure prevention of the disease, but also a good remedy. On the farm of Mr. J. Keller, Klip River, I found every orange tree dead or dying, but an old Pampelmous, though badly effected by red scale, had not a trace of the disease. The rough lemon I also found in several instances had survived the attacks of Mal-di-goma, where oranges and naartje trees under the same conditions had succumbed. Red scale was far more prevalent, and worse than at the first inspection. As to the main facts and points, I have nothing to add or retract from what was said about the Oudtshoorn district in the report of the Citrus Commission on page 8.

Silage v. Cured Fodder.

Amongst other experiments in connection with the relative value of foods for dairy stocks, having especial reference to milk-producing qualities, the Experiment Station authorities at Vermont and Wisconsin have carried out some important experiments with silage and cured fodder. Of a crop of maize, one-half was cured and the other half converted into silage. When the silage was ready, the two fodders were fed to dairy cows, each with an equal quantity of hay and grain. The results were most pronounced, and should be carefully noted by dairy farmers. At the Vermont Station the silage ration gave 837 lbs. more milk than was produced by the dry fodder, which was equal to 11 per cent. increase. At the Wisconsin Station the silage yielded 377 lbs. more milk and 221 lbs. fat, a difference in favour of the silage of 5 per cent. in milk and 6 per cent. in butter fat. This is an experiment which every owner of dairy stock can make for himself if he has, as he should have, a silo. Such increases as are here given should, in the case of a man milking 40 or 50 cows, make an appreciable difference in the monthly cheque from the butter factory.

Mallet Bark.

Mr. D. E. Hutchins, Conservator of Forests (Western Conservancy), writes:—In the last number of the *Agricultural Journal* I inserted a note regarding the newly discovered industry of Mallet bark (*Eucalyptus occidentalis*) for tanning. It will be remembered that it is claimed for this bark that it yields an actual higher percentage than Black Wattle. In some instances the bark has been found to contain the most incredible quantity of half its weight of tannin. Since last month I have seen the lot of Mallet bark in the Arboretum attached to the Government Plantation at Ceres Road. As at Tokai, this is a block of 40 young trees planted two years ago. The average height of the Ceres Road trees is 3 feet 6 inches. Out of the 40 trees planted, 12 failed the first year and were replaced. There were four failures last season. Already beginning to flower. General growth compared with other gums alongside rather poor. It will thus be seen that, contrary to what one would have expected, the early growth of *Eucalyptus occidentalis* at Ceres Road is not so good as at Tokai.

Flies on Ostriches.

Mr. J. C. Loock of Warmbad, Uniondale, raises a question of interest to most ostrich farmers. He writes:—Have you or your many readers a certain remedy for what we call the ostrich fly. I have tried several kinds of dip, but have failed to kill the fly. The only thing that I found to kill the fly is paraffin; but I nearly kill my birds, too, with it. The fly is really getting a very severe plague to the ostrich, for the birds spend more time trying to drive the fly away, and less time looking for food. The fly attacks birds of good condition as well as those in bad condition; but the fly seems to prefer the bird in poor condition. If you, or any of your readers, can recommend me a remedy you will greatly oblige me.

We should like to be able to recommend a "certain remedy," but fear that the very nature of the pest prohibits that. Some farmers use a weak solution of nicotine as a dip, and a five per cent. solution of paraffin and water applied as a spray is said to be effective.

The following extract from a letter recently addressed by Mr. H. A. Holmes of Kendrew, to the Government Entomologist, seems to point to a solution of the problem. Mr. Holmes writes:—"We don't find the 'Ostrich Fly' bother the birds much now except it is very dry and the birds poor. In my camps near the Sundays River, where thorn trees are plentiful, I find the Bee-catcher keeps the fly in check, but I don't think this bird goes much out into the open. At one time we found insect powder very good in its effect. We had a small room holding about twenty ostriches, and we made it as air-tight as we could, blew the insect powder on the birds and about the room, and it killed a great many of the flies, and the others were easily caught. We tried spraying, but it did not help."

A record of the various experiments tried by other farmers in this direction should make interesting reading. We should be glad to publish any that our readers may forward.

Inoculation of Imported Cattle for Redwater.

Mr. P. E. Leonard, of Glendower, Kokstad, writes:—"I shall be much obliged if you will let me know, through the columns of the *Agricultural Journal*, whether virus for Redwater can always be obtained at the Government Bacteriological Institute, Grahamstown, and if you would recommend such being used in preference to the defibrinated blood from a salted beast. In the case of imported cattle, would it be safer to make a smaller injection the first time, and then a larger one—say two months afterwards? In the event of a high rise of temperature resulting from inoculation, what would be the best course to adopt? I have been told that it is safe to commence dosing about ten or twelve days after inoculation, before the fever has had time to develop. By doing so, would the animal be less likely to be salted than it would be it it were left till the temperature had gone up and there were signs of sickness? Of course I do not consider that there is much risk in inoculating Colonial cattle, as I have done a considerable number and have not lost any. But I believe there is far more risk in treating imported cattle, the losses sometimes amounting to 33 per cent. I am thinking of inoculating some imported cattle in the early spring. Hence my reasons for asking the above questions."

In reply to the above, the Colonial Veterinary Surgeon (Mr. D. Hutcheon, M.R.C.V.S.) says:—The Director of the Bacteriological Institute, Grahamstown, prepares blood for the inoculation of cattle against Redwater, but I am doubtful whether it could be conveyed as far as Kokstad without suffering from deterioration, as it cannot be preserved, so as to maintain its qualities unimpaired, for more than about four days. Under any circumstances, I recommend fresh salted blood drawn from a salted beast, under proper precautions. With respect to the selection of a salted beast from which to obtain blood for inoculation, our experience is, that the blood of animals which have recovered from Redwater, even when they are all drawn from the same veld, varies considerably in its virulence. In some cases the blood gives rise to little or no fever reaction when inoculated into susceptible animals; while in other cases the fever-reaction is so severe that a heavy mortality may follow the inoculation. Further, blood of a salted ox may, and generally does, increase in virulence during the summer and autumn months corresponding to the increasing virulence of the tick infection; hence it is safer to inoculate cattle during the winter and early spring months. The blood of salted cattle is likely to be milder and more uniform in strength during that period, than during the summer and autumn, when tick inoculation is active. The only safe plan, however, is to test the salted animal's blood on a limited number of animals of comparatively little value before using it for inoculating whole herds, or very valuable animals.

With respect to the size of the dose of blood used for inoculating for Redwater, it would appear from a lengthened experience that the amount of the blood injected, within certain limits, is of much less importance than the strength or virulence of the blood. 5 c.c. is the usual dose injected, when inoculating Colonial-bred cattle, but for imported animals a smaller dose is recommended, about 2 c.c.

With respect to the animals to be inoculated, it is of equal importance to these that the operations should be performed during the winter, so that they may have recovered from the fever produced by the inoculation before active tick infection commences. If the inoculated cattle are exposed to active tick infection simultaneously with the inoculation, both the artificial and natural inoculation may run more or less concurrently, and tend to intensify one another. This explains the heavy mortality which frequently follows inoculation for Redwater when the owner delays the operation until the disease has already appeared amongst his cattle.

With respect to imported cattle, the following precautions should be taken: (*a*) To import only young animals, about one year old; these usually possess a stronger resistance to the disease than older animals, and stand a much better chance of recovering. (*b*) The importation should be made in the winter or early spring months only, when active tick infection is in abeyance. And they should be inoculated as soon after arrival at their destination as possible. Redwater, whether naturally acquired or artificially produced, is always milder in the cool weather of winter than it is in the hot summer weather.

If cattle susceptible to Redwater are introduced to an infected area during the summer months, every possible precaution must be taken to keep them free of ticks, until after they have been inoculated and passed through the accompanying fever.

With respect to treatment, it is important to protect the inoculated animals from exposure to rough weather, and to feed them on laxative diet, green food being the best if it can be obtained.

Should the bowels become constipated, a dose of salts should be administered. I prefer a mixture of sulphate of soda and common salt, similar to the dose No. 1 given on page 755 of last month's *Journal*. After the fever has set in, experience recommends the administration of germicides, such as carbolic acid, in drachm doses, or the various tar derivatives, such as Jeyes' Fluid, Little's or MacDougall's Sheep Dips, in combination with salts or oil sufficient to keep the bowels acting. Quinine is also recommended in doses of 1 to 2 drachms, two or three times daily.

Aconitine for Poisoning Vermin.

A correspondent to the *Midland News*, signing himself "North-West," forwards us a copy of a communication of his published in that paper, in which he draws attention to the advantages of using aconitine instead of strychnine for poisoning jackals. He states that aconitine is an absolutely tasteless poison. The jackal will, therefore, not be able to detect it; and it is very much stronger than strychnine, although more expensive. It is perfectly true that aconitine has many advantages over strychnine, and owing to its greater strength a smaller quantity will suffice and thus, perhaps, make up for the increased expense. As a matter of fact, its virulence is five times greater than strychnine, for it is probably one of the most deadly poisons known. This is its great disadvantage also, for it involves the maximum of care in handling. When we state that one-tenth of a grain is a fatal dose for an adult—and there are 480 grains in an once—this point scarcely calls for further accentuation. In addition to that the most minute fragment of the dust, too small to be seen, if accidentally blown into the eye, will set up most painful irritation lasting for hours; while a like amount, if inhaled, will produce considerable bronchial irritation, or profuse sneezing and considerable catarrh.

Treatment for Tulp Poisoning in Cattle.

On the above subject the C.V.S. (Mr. D. Hutcheon, M.R.C.V.S.) writes in response to a correspondent:—

The general effects of tulp and other irritant plants upon cattle, when they eat a sufficient quantity, is to produce acute inflammation of the fourth stomach and bowels, accompanied by venous congestion of the brain, and great nervous prostration. In very acute cases there is violent purging, the fluid fœces usually containing blood and mucus. Tulp, when eaten in sufficient quantity, more especially when taken on an empty stomch, produces its irritant and poisonous properties so rapidly, that, unless treatment is adopted promptly, there is very little hope of success. The main question for consideration is:—What line of treatment should be adopted? Should a dose of purgative medicine be given, to assist in clearing out the remains of the irritant poison from the stomach and intestines? This would appear to be the rational method of treatment, acting on the maxim;

"remove the cause, and the effects will cease." But we have to consider the fact that the mucous lining of the fourth stomach and bowels is already in a state of acute inflammation, which an active purgative would tend to intensify. It will be apparent, therefore, that if a purgative is given, in an acute case, it should be one which would exercise a *soothing*, and not an *irritating*, effect on the stomach and bowels.

There is another point which is deserving of careful consideration in the treatment of tulp poisoning, and that is the fact that the principal cause of death is the irritant properties of the plant on the mucous membrane of the digestive tract, rather than its general depressing effect upon the nervous system, due to absorption of the poison from the digestive organs, although the latter condition must not be ignored. If then, the immediate cause of death, in acute cases, is inflammation of the stomach and bowels, our principal consideration should be to modify that inflammatory action as much as possible. I may be told that many cases have been cured by the administration of large doses of Epsom or Glauber Salts. It should be borne in mind, however, that the intensity of the attack corresponds to the quantity of the plants eaten. It will be observed that when one or more spans of oxen are placed upon veld which is over-run with tulp, it usually happens that the first cases which exhibit the symptoms of being affected are the most severe, and run their fatal course very rapidly: the subsequent cases becoming gradually milder, and more amenable to treatment.

It may be accepted, therefore, as a general recommendation in the treatment of tulp poisoning, that, in very acute cases, accompanied by diarrhœa, large doses of strong astringent and soothing medicines should be administered, such as catechu and opium, in order to arrest the action of the bowels, and allay the acute inflammation.

In a recent instance, in which a number of oxen became severely affected, after being placed, while hungry, on a portion of veld containing a large quantity of the bulbous plant, identified by Prof. MacOwan, as *Homeria Collina*—popularly considered a species of tulp, and evidently possessing similar irritant properties—Veterinary Surgeon Neill obtained very favourable results by administering, to the more acute cases, in which diarrhœa had commenced, from two to four drachms of powdered opium, mixed in a pint of raw linseed oil, and followed by large doses of starch gruel. A very soothing mixture for administering along with opium in such cases is a mixture of equal parts of raw linseed oil and lime water. Old experienced transport riders used to administer a large dose of a decoction of Mimosa bark, which is a strong astringent. Large quantities of milk and lime water were also given when obtainable.

A case which occurred near Port Elizabeth many years ago is somewhat typical of many that are met with:—A cow was taken suddenly ill while grazing on the veld, and was unable to follow the other cows home the same evening. The following morning the owner found her lying unable to get up, or to stand when lifted. She was then carried home on a cart, and I saw her immediately after her arrival. The cow manifested great nervous prostration, associated with tremulous excitement, and purging; the fluid fœces being mixed with mucus. She was in a semi-delirous condition, and unable to raise even her fore-quarters. It was evident that the cow had eaten some noxious plant of a violent irritant and depressing character. I treated her empirically and gave her the following dose:—

Powdered Chloride of Ammonia ...	1½ ounce.
Extract of Belladonna . ..	1 drachm.
Warm water . ..	1 pint.

thoroughly mixed. I repeated this dose every four hours, until four doses were given. By this time the purging had ceased, the nervous excitement and semi-paralysis had nearly disappeared. I then gave her a bottle of raw linseed oil as the bowels showed a tendency to become constipated. The cow made a rapid recovery.

As already indicated, the general treatment of all such cases whether produced by tulp or similar irritant plant, is to administer soothing and astringent remedies, combined with diffusable stimulants, such as the salts of ammonia; either the carbonate or the chloride. I prefer the latter, when the brain appears to be involved, but the carbonate is the more active stimulant. In the milder cases, repeated doses of lime water and raw linseed oil, with a little opium added, will act as a soothing purgative. An excellent stimulant to a cow or ox under such circumstances, is half a bottle of whiskey, or good brandy mixed in two bottles of hot strong tea, nicely sweetened.

When evidence of tulp poisoning appears amongst cattle which have been newly placed on tulp-infested veld in addition to treating all those that manifest symptoms of being affected—it is advisable to give the whole of the other cattle exposed a good dose of purgative medicine to clear out the irritant before it has had time to produce its full effects.

P. McManus del et Lith.

FIG. 2

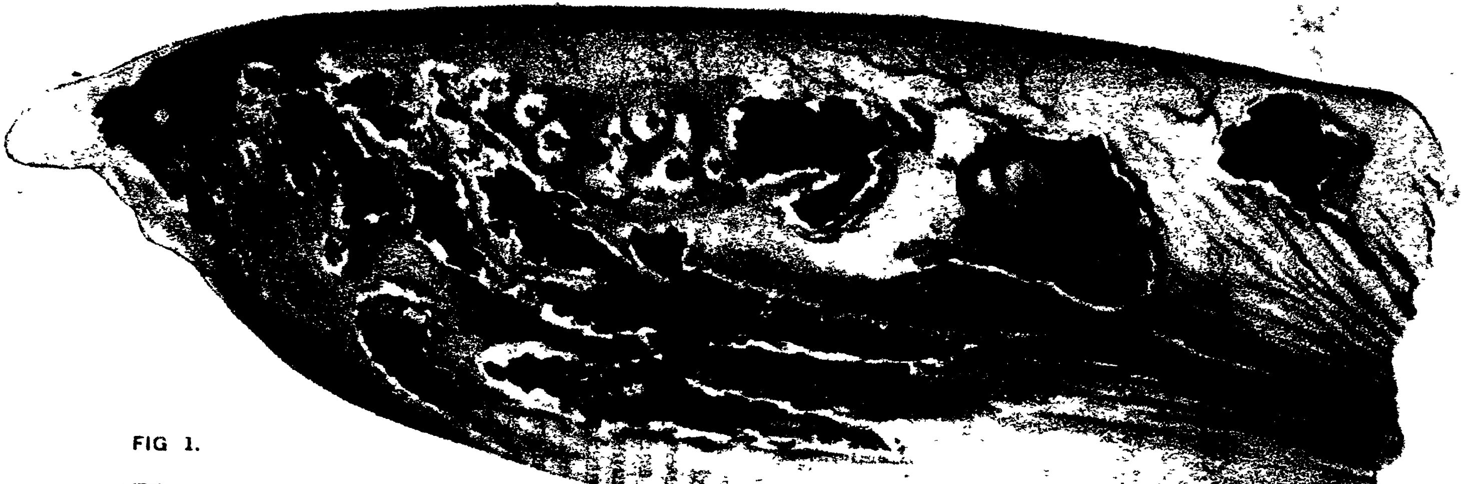


FIG 1.

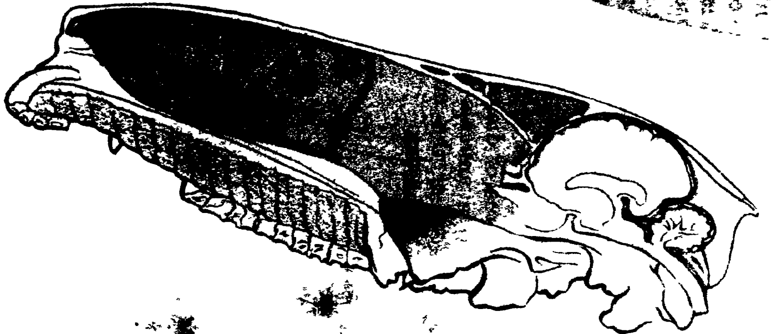


FIG. I. Showing Section of the head.

FIG. II. Showing characteristic appearance of the ulcers on the septum of nostril in an acute case of glanders.

GLANDERS.

By D. Hutcheon, M.R.C.V.S., Colonial Veterinary Surgeon.

This disease has been more prevalent in many districts of the Colony during the past four years, than it has been at any previous period of Colonial history. This unfortunate condition is due mainly to the war, and the dispersion of the cast and surplus military horses and mules at its termination. This is only what might have been expected, as an increase in the spread of glanders has invariably followed in the train of military operations everywhere. During the war, horses were brought to South Africa from almost every horse-breeding country in the world, and as there are comparatively few countries which are entirely free from this equine plague, it is practically impossible to exclude every infected animal from the respective consignments that arrive. Every precaution, practicable under the circumstances, was taken by the military authorities to prevent infected animals from being sent into the field; they got in, however, and the disease became widely spread. The result was, that, when the cast and surplus horses and mules were finally disposed of at the termination of hostilities, they carried the disease with them in all directions. I readily admit that it is very difficult to detect every infected animal by the most careful application of the Mallein test, but I regret that I am unable to credit the military authorities with even an earnest attempt to apply the recognised means of diagnosis as it should have been applied; before submitting these animals for public sale. It was an economical mistake on the part of the military, and it resulted in a fearful loss to the Colonial purchasers.

HISTORY OF GLANDERS.

Glanders or Farcy is one of the oldest known diseases of the horse. It is referred to by Greek and Roman authors, and was considered as an infectious disease early in the seventeenth century. The identity of glanders and farcy was recognised in the eighteenth century, and its transmissibility by inoculation with the purulent secretions of affected animals was demonstrated about the same time.

During the nineteenth century the principal contention centred round the question whether glanders could arise spontaneously from any debilitating influences, such as bad sanitary conditions, overwork, improper food, or follow an attack of strangles, or similar disease of the respiratory organs. It was not until the year 1882 when Loffler and Schütz succeeded in discovering the true bacillus of glanders in the diseased tissues of affected animals;

cultivating it and transmitting the disease to susceptible animals by inoculating them with pure cultures of the bacillus, that positive proof that glanders is a specific infectious disease produced exclusively by the *bacillus mallei* was obtained.

Microscopical Appearances.—The *bacillus mallei* is a short rod 2 to 3 μ. long, and 0·2 to 0·4 μ. thick, with rounded or slightly pointed ends, generally occurring in single rods, sometimes in pairs, and very seldom in long filaments (Bowhill). In stained preparations it often appears more or less beaded. It does not form spores, and is probably nonmotile. It is a facultative organism growing both with and without oxygen (Hewlett).

Glanders is essentially an equine disease, affecting horses, mules, donkeys, and jennets. It is capable also of being communicated to man and many of the lower animals by inoculation, either experimentally or accidentally.

Guinea pigs and field mice are highly susceptible to the disease. It is also contracted by some of the carnivora, such as the cat, lion and tiger, by inoculation or by feeding on diseased carcases. The rabbit, sheep, goat and dog are but slightly susceptible, while cattle, swine, house mice, white mice, rats and domestic fowls are immune. There is a great difference in the individual susceptibility of horses to glanders infection. Some seasoned horses may remain for many months, and even years, in a stable in which glanders exists in a chronic and latent form, and yet remain apparently free from infection, whereas any fresh animals introduced into that stable, may develop glanders or farcy in an acute form within a month or six weeks of their entry. I have seen many cases of this nature before the discovery of mallein, but one very interesting case occurred in an omnibus stable which contained twelve horses. One of these was a mare, which I strongly suspected of being affected with glanders, although she manifested no diagnostic symptoms to enable me to convince those in authority that she was a dangerous animal and ought to be removed. However the horse that stood next to her, and worked in the same team with her, became rather too stiff and worn for the 'bus work, hence he was relegated to work in the forage wagon, and his place in the bus team filled by a young newly purchased horse. This animal had only been in the stable five weeks, when he became affected with acute farcy and was destroyed. The stable was thoroughly cleaned and disinfected and another fresh young horse introduced. I strongly urged the removal of the suspected mare, but those in authority including the driver, would not listen to any remonstrance, as the driver considered her the best of the team. This second horse had only been in the stable about six weeks when he began to manifest the symptoms of glanders, which very soon developed into an acute form, and he was likewise destroyed. It was only after the loss of this second horse, that I got permission to remove the suspected mare to a yard where a number of other suspects were kept and worked apart from the rest of the stud. The stable was again thoroughly cleaned and disinfected before other two new horses were introduced, and singular to relate, no other case of glanders occurred in that particular stable during the subsequent two and a half years that the horses remained under my charge. The old horse that was sent to work in the forage wagon also remained to all appearance healthy for about two years, when he was purchased by a canal boat-man. The suspected mare continued to work in one of the omnibuses for about two years, and although before that time she began to exhibit a slight discharge from the nostrils, she continued to do her work well, and maintained her condition, until one day she fell on the street, and severely injured her right hip. On the second day after the accident she was covered with Farcy buds all over her body; ulcers began to spread rapidly on the nasal mucous membrane, and her lungs, on post mortem examination, were a mass of glanders tubercles.

It is, of course, impossible to say whether any of the other horses left in that stable, after the mare was removed, were actually affected with glanders, as we had no means then of testing them; but I am of opiniom that they were not, as similar satisfactory results were obtained in other stables by the adoption of the same measures.

All clinical experience indicates that the infection of glanders is carried but a very limited distance, if at all, in the atmosphere of a stable. It usually spreads first to the horse or horses which have been working with the affected animal, secondly to the animals which stand immediately adjoining it, and thirdly to horses which are fed and watered out of the same mangers and troughs.

ACUTE AND CHRONIC GLANDERS.

These definitions depend largely on the progress of the disease. Chronic glanders usually occurs in an otherwise healthy horse, in good condition. Many horses have been known to suffer from glanders for years—one case is reported to have been under observation for eight years and during the whole of that time this affected animal performed its regular work, and maintained its usual condition; the disease assuming an acute form only when some other debilitating influence intervened, such as overwork, deficiency of food, an accident, or the concurrent development of some other disease, such as influenza, strangles, or a common cold.

It is such cases as these that gave rise to the opinion, so largely entertained formerly by many leading Veterinarians—and by the public generally, at the present time—that neglected colds, strangles and other debilitating diseases, have a tendency to terminate in glanders. Anything, therefore, that exercises a debilitating influence on the constitution of a horse which is suffering from chronic glanders, whether in a hidden or visible form, has a tendency to cause the disease to assume an acute and rapidly fatal character. Hence it was formerly the custom to bleed a horse that exhibited symptoms suspicious of glanders, or give him a good big dose of physic, in order to lower his vitality, and thereby induce the development of the characteristic lesions of the disease.

It must not be inferred from the above that no cases of acute glanders occur in otherwise healthy animals, there are many such which run their course very rapidly.

THE MODE OF ENTRY OF THE GLANDERS VIRUS.

Respecting the channel by which the infective agent of glanders enters into solipeds, considerable differences of opinion are entertained by leading Veterinarians.

Professor McFadyean, who is one of the strongest advocates for the inhalation theory, says.—"I agree with those who maintain that the glandered tubercle generally begins in the parenchyma of the lung, that is to say, in connection with the air vesicles; but whether in consequence of the arrest of glanders bacilli in an alveolar capillary, or the penetration of bacilli into an air vesicle with the inhaled air, is a point which can hardly be determined from microscopic examination of the natural lesions.

"Both the form and the histology of a glanders tubercle clearly indicate that the irritant (the bacilli) is massed at its centre, and both are irreconcilable with the view that the lobule is invaded secondarily from its periphery to its centre.

"If glanders tubercles were, as some maintain, generally of hæmatogenous origin (as in acute miliary tubercles of the lung), one would naturally expect them to be pretty uniformly distributed throughout both lungs and to be obviously of the same age. But the tubercles are frequently confined to one lung, seldom uniformly distributed in either organ, and nearly always of different ages, as indicated by their structure. These appear to me to be insuperable objections to the view that the pulmonary glanders tubercles are caused by the embolic arrest of glanders bacilli circulating in the blood. On the other hand, neither the irregular distribution, nor the difference of the age of the tubercles, is opposed to the view that the bacilli are disseminated by way of the air passages, and that the starting point of a tubercle is the multiplication of bacilli that have come to rest in the cavity of an air vesicle.

"If alimentary infection were the usual method of infection, we should at least expect to frequently find lesions in the mesentery, or mesentric glands. In subcutaneous inoculation we always get lesions in the group of lymphatic glands which intervene between the point of inoculation and the thoracic duct, and when we get lesions on the mucous membrane of the nose, we promptly get lesions in the submaxillary lymphatic glands. In farcy of a hind leg, we also get the inguinal glands affected."

Again, in referring to the unequal age and distribution of the glanders tubercles in the lungs he says:—"We cannot imagine a horse ingesting glanders bacilli every day, or repeatedly at short intervals. What would better explain what we actually find would be the supposition that the bacilli are inhaled once, they are carried in with the air and reach the lungs, and there they set up glanders tubercle, where the bacilli escape by way of the bronchi. The bacilli are coughed up, to be thereupon passed into the higher bronchi, and may be drawn back to the outward part of the lung and set up another tubercle. Once a tubercle is freed it may be carried from one part to the other by way of the lymphatics." (*ibid*)

In reply to these observations Mr. Hunting says:—But if bacilli can escape from a glanders tubercle, which has been formed in an air vesicle, and can then be carried from one part of the lung to another by way of the bronchi, or lymphatics, is there any anatomical barrier against the escape of bacilli from a glanders tubercle which has been formed by the arrest of the bacilli in an alveolar capillary, and their subsequent distribution to other parts of the lung? If there is, it has not been shewn, and if there is not, the irregular distribution of the tubercles in the lungs, and the difference in their ages, are as easily reconcilable with hœmatogenous origin as with their inhalation origin. It naturally follows that the ingestion of glanders matter once only is just as capable of giving rise to the successive formation of tubercle in the lungs as is the inhalation of bacilli once only."

With respect to the objection that "if alimentary infection were the usual method of infection we should at least expect to frequently find lesions in the mesentery, or mesenteric glands." Granted, if we got glanders lesions on the mucous membrane of the bowels, we would expect to find tubercle in the mesenteric glands, but we do not meet with glanders lesions on any part of the intestinal mucous membrane, not even about the mouth, which is much more exposed to infection than the nostrils, and greatly more liable to local inoculation on account of the tendency to injury and abrasions of its mucous membrane."

"But the line of infection from the digestive canal cannot be traced even in those cases in which the infection has been experimentally conveyed through the stomach, which clearly indicates that—like many other specific infective diseases—glanders lesions do not necessarily develop at the point of entry of the bacilli, but manifest a special affinity for certain organs and tissues, and are rarely found in any other. Pulmonary lesions are the most constant, and most characteristic of glanders, and in a large number of cases the lungs alone are affected." (*ibid*)

Referring to the rare occasions in which glanders lesions are found in the liver and mesentery, Mr Hunting says:—"It may be that the bacillus has no power to locate itself in these organs, and so cause structural changes, or lesions of a temporary nature may be produced, but soon disappear. Glanders lesions of the skin and subcutaneous tissues are never permanent (when due to local inoculation) if the horse recovers from the general disturbance." Further, "glanders has been produced experimentally by ingestion and inoculation, whereas all attempts to produce glanders by inhalation have failed, and although this does not prove that glanders cannot be spread by inhalation, it affords strong presumption that ingestion is the common method of infection."

It is now generally recognised that the infective material of glanders is contained in the discharge which flows from the mucous membrane of the air passages of affected animals. It is also contained in the fluid contents of the ulcers in cutaneous glanders or farcy. The blood does not contain the virus ordinarily, and experimental evidence shews that it is not contained in the breath of an affected animal if there are no local lesions, even if that animal contains glanders tubercles in its lungs. Those who believe that infection takes place through the respiratory organs are of opinion that the infective material which is discharged from the nostrils, becomes dry, and is then inhaled by healthy susceptible animals in the form of dust particles. It may be taken in with the food in any form, moist or dry.

Glanders may therefore be transmitted from an affected to a healthy animal directly or indirectly. Directly by close contact of an affected with a healthy animal; or indirectly through healthy animals eating out of the same manger or drinking out of the same bucket that has been used for a glandered horse. The stable walls, stalls, floors, bedding and utensils may also be mediums of infection, as horses are very liable to lick or chew any of these and thereby ingest the virus; and if the infection is liable to be inhaled along with particles of dust when the stable is being swept, it points to the necessity of thoroughly cleaning and disinfecting the floor, as well as the walls, stalls and mangers.

Glanders Tubercles in the Lungs.—These vary in size from a mustard seed to that of a pea. A few may be as large as a hazelnut or even larger, but the great majority are about the size of a small pea. On passing the fingers firmly over the lungs these tubercles convey an impression as if a number of large shot were embedded in the lung tissue. They vary greatly in number. In some cases the lungs are studded all over with them, while in others there may be no more than two or three and these difficult to find. They are seldom uniformly distributed throughout both lungs. They may be present in one lung only or both. In the latter case they may be much more numerous in one than in the other.

It is rare also to find all the tubercles uniform either in size or appearance on section in the same case. "Very frequently they show a greyish or opaque yellowish white centre, and around that a dark hœmorrhagic zone, which varies in width according to the size of the tubercle. Occasionally the centre of the tubercle has undergone puriform softening to such an extent as to convert it into a distinct abscess. Many tubercles are devoid of the hœmorrhagic zone, but have a firm white central part, and a greyish periphery; sometimes the whole of the tubercles present may be distinctly gritty towards the centre. These differences correspond to differences in the age of the lesions."—(McFadyean.)

In the great majority of cases the lung tissue through which the glanders tubercles are scattered remains normal in appearance, but occasionally a glanders lung shows one or more large areas in which the lung tissue is more or less consolidated. "Sometimes the solid part is completely hepatised with a consistence about equal to the recently hepatised lung in bovine pleuro-pneumonia. Such a piece cuts with a smooth surface, in which one can distinguish the parenchyma, and the thickened interlobular tissue. The cut surface is moist, and a little clear fluid may escape from it. In the parenchyma which is pinkish in colour (more often light slate colour) one may discern pinhead white points, which, on microscopic examination, are resolved into glandered tubercles."—(Ibid).

In cases of this character which I have most frequently met with, the solidified portion of the lung, whether large or small, invariably embraces the lower border, and presents a bluish pink colour. The bronchi, large and small, are filled with a muco-purulent material. In fact the appearances presented are very similar to those met with in cases of catarrhal pneumonia, terminating in interstitial pneumonia. On examining microscopic specimens prepared by Mr. Robertson, Bacteriologist to the Department, the alveoli were seen to be filled with a similar infiltration.

Prof. O. Williams refers to post-mortem lesions in glanders of peculiar masses like white soap. These were not encysted, but in an active and acute stage.

Pleural Lesions.—In some chronic cases where the glanders tubercles are situated in the lung tissue close to the surface of the organ, the pleura lying immediately over it is thickened.

Glandered Nodules on the Mucous Membrane.—The general form is that of slightly elevated nodules on an inflamed and indurated base surrounded by a hyperæmic zone. They are of a tolerably firm consistence, yellowish white in the centre, prone to disintegration and the formation of ulcers. The surface of these is glistening, covered with a puriform fluid, mingled with blood. These ulcers gradually extend and coalesce with one another, forming larger ones, which have a tendency to eat their way into the underlying tissues, and even at times leading to necrosis of the nasal septum. I have often seen a large portion of the nasal septum completely removed by this rapid ulcerative process. In other cases of long standing, I have seen the mucous membrane covering the septum greatly thickened by an exudation of a fibro-cartilaginous character, and containing numerous cicatrices on its surface; evidently the remains of healed ulcers. All appearance of active local disease had ceased, although the lungs were full of the characteristic tubercles.

FARCY.

Farcy is a form of glanders in which the cutaneous tissues and superficial lymphatics are involved. The nodules, or farcy buds as they are called, are found in the papillary layer of skin, and in the sub-cutaneous tissues. The swellings of acute farcy are generally confined to the extremities and resemble the swellings of acute lymphangitis or œdema, involving the skin and sub-cutaneous tissues. The limb is hot, painful, and there is marked lameness. As the swelling subsides the enlarged lymphatic glands and vessels become manifest, forming the characteristic buds and cords. Sometimes the swelling is localised and circumscribed on which the buds arise, and the lymphatic vessels extending from these buds to the lymphatic glands, and from one bud to another, become enlarged and corded, these cords frequently present a knotted appearance like a string of beads.

The nodules or farcy buds usually follow the course of the veins on the inner side of the limb, but they may appear all over it.

They not infrequently appear along the course of the lymphatics of the neck, and in very acute cases, when the animal is manifestly breaking up, they may appear all over the body. But acute glanders usually becomes developed in such cases.

Farcy buds vary in size from a pea to a large marble, and they are not distinctly separated from the surrounding tissues. They rapidly disintegrate and form ulcerous sores, with ragged granular edges, which have a tendency to extend and coalesce with one another and discharge a yellow creamy glairy fluid, tinged with blood.

Farcy, like glanders, may assume a sub-acute or chronic form in which the local symptoms precede any apparent febrile disturbance. These local symptoms consist of circumscribed inflammatory swellings, running in the direction of the principal blood vessels, which suppurate and burst without much accompanying engorgement of the surrounding areolar tissue. The ulcers heal up, leaving the cicatrices behind, but all other symptoms disappear, sometimes permanently but more frequently to return in an acute form.

In some cases in which the development of the disease appears to be arrested, buds will appear along the course of the lymphatics, more especially in the pectoral and radial regions of the fore limb, but they manifest no tendency to disintegrate or come to a head, they remain like a knotted cord. These used to be called "button farcy."

Farcy may arise from cutaneous infection through a wound or abrasion of the skin, but it is more frequently due to general infection, the infective matter being arrested in the capillaries and forming emboli, which give rise to the specific cutaneous ulcers. When cutaneous farcy ulcers arise from local infection, it is believed to be much more amenable to treatment than when it is due to general infection. It is only in comparatively few cases, however, in which farcy ulcers are found on the skin, without the presence of glanders lesions in the lungs. As a rule all visible signs of glanders in the horse are secondary to infection of the lungs." (*Hunting.*)

Symptoms.—Previous to the discovery of mallein, glanders could not be detected with certainty during life, until the animal developed the characteristic lesions. But in a stud in which glanders has already appeared, or which may have been exposed to infection, there are certain symptoms which would lead a close observer to suspect any animal manifesting them, to be infected. For example, horses which are affected with glanders tubercle in the lungs very often present an unthrifty appearance, and when suddenly exposed to a draught of cold air, or after taking a drink of cold water, their coats become rough and erect—staring. Their temperature also is irregular, and may be two or more degrees above normal, but unless the stud is a suspected one, neither of these symptoms is in itself diagnostic of the presence of glanders, as it may arise from other chronic disease or derangement of the system.

The usual symptoms upon which reliance was placed, before the diagnostic value of mallein was discovered, are somewhat as follows:—Generally the first symptom observed is a slight catarrhal looking discharge from one or both nostrils; more frequently from one only. At first it is irregular in quantity, and may be absent at intervals. It however gradually increases, is of a bluish-yellow colour, like finely made thin starch, and is adhesive in its character, sticking to the edges of the nostrils. The lymphatic glands situated on the inner side of the lower jaw become swollen and painful. If the discharge is from one nostril, the glands on that side only may be affected. Later the glands become hard, painless, and generally adherent to the jaw. They manifest no tendency to degenerate, ulcerate, or form into an abscess, even when blisters are applied; but they may fluctuate in size, and sometimes even temporarily disappear. These symptoms may continue for months, and even years, before the characteristic glanders nodules and ulcers appear on the lower portion of the mucous membrane covering the septum dividing the two nasal chambers, so that they can be detected on examination. It should be borne in mind, however, that there may be a chronic discharge from one or both nostrils arising from chronic catarrh, pus in the sinuses, &c., and this discharge may be accompanied by a swelling of one or both submaxillary glands, arising from a diseased tooth, caries of the bones, or any local disease due to an injury; so that until the characteristic lesions of glanders appear on the mucous membrane of the nostril, or farcy buds or ulcers show on the skin, it is impossible to certify to the presence of glanders.

When glanders assumes an acute form, the animal becomes rapidly emaciated and greatly depressed; the temperature is high—105° Fah. and over, the breathing is quickened and accompanied by a snuffling sound in the nostrils; the nasal discharge becomes thicker and often mixed with blood. The visible mucous membrane of the nostrils is covered with nodules, which disintegrate and form ulcers which become confluent. There is also infiltration into the submucous tissue, so that the whole mucous membrane presents a purulent gangrenous appearance.

Mallein.—"Mallein is an analogous preparation to Tuberculin. It is prepared by growing a virulent glanders bacillus in glycerine veal broth, in flat flasks such as are employed for tuberculin, so that there is free access of oxygen for a month or six weeks. It is then autoclaved for fifteen minutes at 115° C., filtered, through a Berkefeld filter, concentrated to one-fourth of its volume, and mixed with an equal volume of a half per cent. solution of carbolic acid."—(*Hewlett.*)

Mallein is used principally for the diagnosis of glanders in the equine species, and its discovery which was made by Helman, and applied by Kalning in 1890. has completely changed our methods of dealing with that disease. Before mallein was available, the diagnosis of many cases which presented suspicious symptoms was most difficult, whilst the detection of those latent cases, in which there are no visible symptoms, was impossible. With the aid of mallein, the diagnosis of such cases is now an easy matter, and practically certain when it is used with skill and judgment.

The following are the

Directions for using Mallein.—1. Horses that are to be submitted to the Mallein test should be left at rest in the stable the day before the test is applied, and protected from draught and any great changes of temperature, and should have their temperatures taken in the morning first, and again in the evening when the test is applied. Should any animal exhibit a high or irregular temperature it should be kept over for a day or two for further observation before being tested.

2. The dose of mallein for the horse is one to two c.c., depending on its concentration. It ought to be injected about the middle of the side of the neck, with a clean hypodermic syringe. The best form of syringe is one with an asbestos piston, as the whole instrument may then be sterilized by boiling it in water for five minutes before use.

3. The mallein must be injected into the subcutaneous connective tissue, and care must be taken that the whole dose is actually introduced.

4. The temperature must be taken at the time of injection, and at the 9th, 12th, and 15th hours afterwards.

5. Provided the temperature was normal (under 101° F.) before the injection, it will rise 2° or more (103° to 105°) during the next fifteen hours if the horse is glandered, but it will remain practically unaffected (under 102°) if the horse is not glandered.

6. Attention must also be paid to the swelling that forms at the seat of injection. When the horse is glandered this goes on increasing in size during the second twenty-four hours after the injection, and it seldom declines before the third or fourth day. The maximum diameter of this swelling in glandered horses varies from five to ten inches.

7. In horses that are not glandered, the local swelling attains its maximum size during the first fifteen hours, and by the twenty-fourth hour it has almost entirely disappeared. Its maximum diameter is usually about three or four inches.

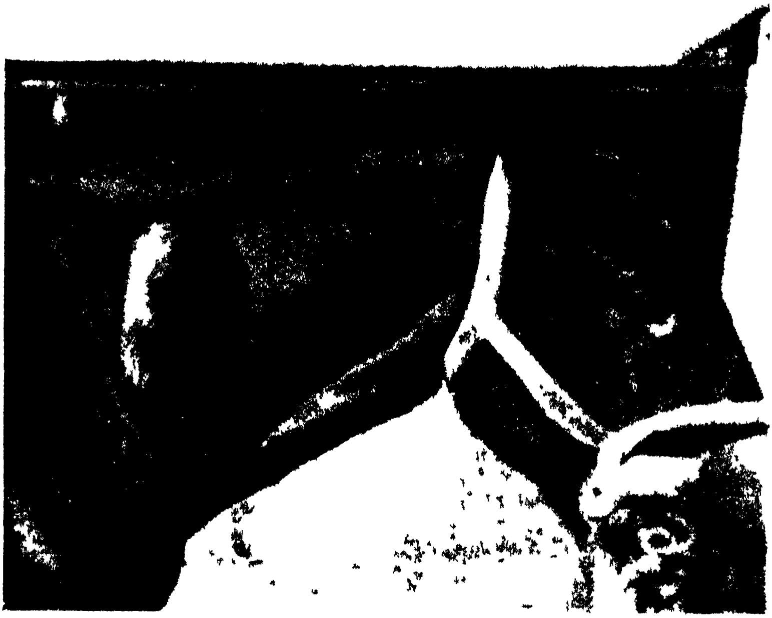
8. When the temperature gradually rises from the normal to 104° during the first fifteen hours, and a large slowly disappearing swelling forms at the seat of injection, the horse may confidently be declared glandered.

9. If, with a normal temperature at the time of injection, a horse displays only the temperature reaction, or only the local reaction, the case must be considered doubtful, and the test repeated after the lapse of a week.

10. When the temperature is 102° or more at the time of injection the temperature reaction is unreliable, but in such a case the diagnosis may be based on the character of the local swelling.

11. The mallein should be kept in a cool place, and protected from the light. Should it lose its transparency, or become cloudy, it must not be used.

Curative Action of Mallein.—Horses either recover naturally from glanders, or mallein exercises a curative effect. This is very evident from the fact that many horses which give a decided double reaction to the mallein test when applied for the first, second, third and even fourth time, ultimately cease to react and do not show visible symptoms of glanders subsequently, at least not for a very long period. How far their recovery is due to the reaction of mallein is not yet clearly demonstrated. Professor McFadyean says:—"Prior to the days of mallein, glanders was never detected during life, except when the animal developed external symptoms; hence the past does not furnish us with a particle of evidence that is incompatible with the view that very many horses become affected with glanders and yet recover." It has been clearly demonstrated during our somewhat unusual experience, that the horses with the smallest number of tubercles in the lungs, often give the strongest reactions to the mallein test. For example, we had a horse which gave a strong double reaction at the first, second and



Characteristic swelling in an infected animal following Mallein Test.

Further view of similar case after Mallein Test third mallein test; he was then killed. and on a *post-mortem* examination made by my assistants, Messrs. Robertson and Armstrong, they were able to discover only one small tubercle in the lung after a most careful search in all the glandular structures of the body. Now if this animal had belonged to a private owner, we would have had a difficulty in convincing him that there was any evidence of glanders present in the carcase. If we consider that the first mallein test was applied to this horse nine weeks before he was killed, it will be evident that the disease made little or no progress during the interval, and that there is every probability that it would have been completely arrested. We have examined a large number of similar cases amongst the cast military horses, in which we found, *post-mortem*, only two or three tubercles in the lungs, although the animals had been tested twice and were under observation from one to two months. It is satisfactory to be able to state that, we have never obtained the characteristic double reactions to the mallein test without discovering evidence of the presence of glanders on making a *post-mortem* examination, and this is the experience of the majority of those who have used mallein largely; those who have used it most, express the greatest confidence in its diagnostic value.

DEVELOPMENT OF THE VISIBLE SYMPTOMS OF GLANDERS AFTER AN ANIMAL HAS REACTED TO THE MALLEIN TEST.

The public have considerable difficulty in fully understanding the irregularity which occurs in the development of the visible symptoms of glanders after the animal has reacted to the mallein test.

The experiments conducted by Schutz and Nocard have shewn that "when horses receive in their food pure cultures of the Bacillus Mallei, lesions are discernible in the lungs two or three days after inspection, and clinical symptoms in from six to eight days. In experimental infection a rise of temperature is evident on the third or fourth day after; and with large doses of pure cultures a temperature reaction occurs in fifty hours, and a mallein reaction on the sixth day.

"Direct inoculation through the skin or a mucuous membrane, when successful, causes the characteristic lesions in from three to six days, but horses standing in a stable with infected animals may not show clinical symptoms for a year or more. In nearly every case the primary lesion is in the lungs, but it may remain there for an indefinite time without producing any visible signs of its existence." It would appear, therefore, that a horse may react to the mallein test six days after infection, clearly indicating that glanders lesions have become established, but the same animal may not manifest any visible symptoms of glanders for many months after. It is impossible to predict, in any given case, what the course of the disease will be in a horse which has given a distinct and characteristic reaction to the mallein test. He may develop the visible symptoms of the disease within a few days, or he may remain apparently healthy for many months, and during this time he may continue to give a distinct reaction to the mallein test each time it is applied. It is very difficult to convince the owner of such a horse that he is affected with glanders, or that he is in the least dangerous to the rest of his stud. And should the horse ultimately cease to react, the owner will be perfectly convinced that he never was affected.

Are Horses that react to the Mallein Test dangerous to others?—It is generally agreed that the infection of glanders is not given off by the affected animal in its breath, hence it may be argued that until there is some visible discharge from the nostrils, such an animal could not be dangerous to others. But it would be impossible for any one to say when such a horse would begin to be dangerous, because, before there could be a sufficient discharge from the nostrils of an infected horse to attract the attention of any ordinary observer, much mischief might already be done. Besides, a horse with tubercles in the lungs may cough up infective matter long before there is any visible discharge from the nostrils. The only safe course, therefore, is to treat every animal that reacts to the mallein test as dangerous, and to keep it isolated until it either ceases to react, when it can be returned to the stud, or if it begins to manifest symptoms of the disease, it should be immediately destroyed.

Horses that cease to react to Mallein.—The conclusion arrived at by the Committee appointed by the English Board of Agriculture as the result of their experiment is, that a horse that has ceased to react to the mallein test is incapable of spreading the infection of glanders. This conclusion, however, is subject to the qualification that there must have been an interval of not less than two months between the last two mallein tests to which the animal ceased to react.

Mallein should be under Government control.—I am decidedly of opinion that the Government should exercise control over the sale and use of mallein in this Colony. Every facility should be given to owners of horses to test their animals when they express a desire to do so, but unless some control is kept over its use, unprincipled men, who recognise the diagnostic value of mallein, might test their suspected studs, not with the object of clearing them of glanders, but with the less commendable object of selling every horse that gave a characteristic reaction, and thus be the means of spreading the disease far and wide.

DISINFECTION.

Before the originating cause of Glanders—the *Bacillus Mallei*—was discovered, and its vitality experimentally ascertained, the popular opinion was, that the infective agent of glanders was one of the most difficult to kill and eradicate from infected premises. This opinion arose from the fact that it proved so difficult then, with the means at our disposal, to eradicate the disease from a stud of horses in which it had got established. But this difficulty was not due to the unusual vitality of the infective agent of glanders, but to the slow and irregular development of the disease in the lungs and other tissues of the infected animal. We had no definite means then of distinguishing those latent cases in which the disease was confined to the lungs, but the animal manifested no outward indication of its presence. Such animals were, therefore, left in the stud, and were the means of perpetuating the disease. The apparent failure to destroy the infective agent of glanders by every known method of disinfection was, therefore, due to the impossibility of eliminating every affected animal from the stud, and not to the indestructibility of the infection itself. With the discovery of Mallein, and its proved diagnostic value, all this is changed, and it is now an owner's own fault if he leaves any infected animal in his stud after the indications given by the Mallein test.

With respect to the vitality of the *Bacillus Mallei,* it is as easily destroyed as many other pathogenic organisms. According to Löffler, it may live three months in a dry condition, but the majority of authorities find that it dies in ten days when exposed to sunlight. It may, however, remain active a long time in a dark closed stable.

A temperature of 212° Fah. kills the bacillus at once, and 176° kills it in five minutes.

Exposed to the action of Corrosive Sublimate 1 in 1,000, the bacilli are killed in fifteen minutes; and in a 5 per cent. solution of Carbolic Acid, Jeyes' Fluid, etc., in an hour. It will be observed, therefore, that boiling water and sun-light are two of the most efficient, as well as the most economical disinfectants.

All the wood-work, stalls, mangers, etc., of an infected stable, should be scoured with Caustic Soda and hot water, to remove the glutinous discharges which are very adhesive. The walls and floors should be thoroughly washed with boiling water, in which 5 per cent. of Carbolic Acid, Jeyes' Fluid, or similar disinfectant is added; or one ounce of Corrosive Sublimate dissolved in six gallons of hot water. The latter is the most efficient disinfectant, but, as it is a strong poison, it requires to be used with care. All rugs, bandages, and similar articles, can be steeped in boiling water containing the disinfectant. Harness cannot be placed in boiling water, but it may be thoroughly cleaned with warm water, containing a disinfectant, and soap.

All bedding and manure should be burned. If it is impracticable to burn the latter, it should be disinfected, or thoroughly mixed with quick lime. If an infected stable is cleaned and disinfected in the above manner, and thoroughly exposed to the sun and dry air, fresh healthy animals may be introduced without danger, care being taken to prevent any suspicious animal from being introduced with them.

Suppressive measures.—In order to deal effectively with outbreaks of glanders, with as little loss as possible to the owner, every horse which has a suspicious discharge from the nostril should be immediately isolated until the nature of the discharge can be definitely ascertained. As soon as the case is decided to be one of glanders, it should be immediately destroyed, and all the incontact animals submitted to the mallein test. Should any of these give a decided reaction to the test, they should be either destroyed or completely isolated from the other at once. If the latter, the test should be re-applied at intervals of from three weeks to a month, until the reactions indicate any improvement or otherwise. If there are only one or two reactors in a stud, and no convenient arrangements for complete isolation can be made, it is much more economical and satisfactory to the owner to destroy these immediately, and under any circumstances, unless the reactors are of considerable value, it rarely pays the owner to keep them, as the chances are ten to one that they will ultimately develop visible glanders.

EPIZOOTIC LYMPHANGITIS.

This is a contagious disease due to the presence in the lymphatics of a specific organism, the *Cryptococcus farcinosus*, discovered by Rivolta in 1883. It is an ovoid body with a double-contoured envelope, and highly-refractile contents.

The demonstration of the Cryptococcus in the pus, in which it is always present, is one of the means of differentiating the disease from Farcy.

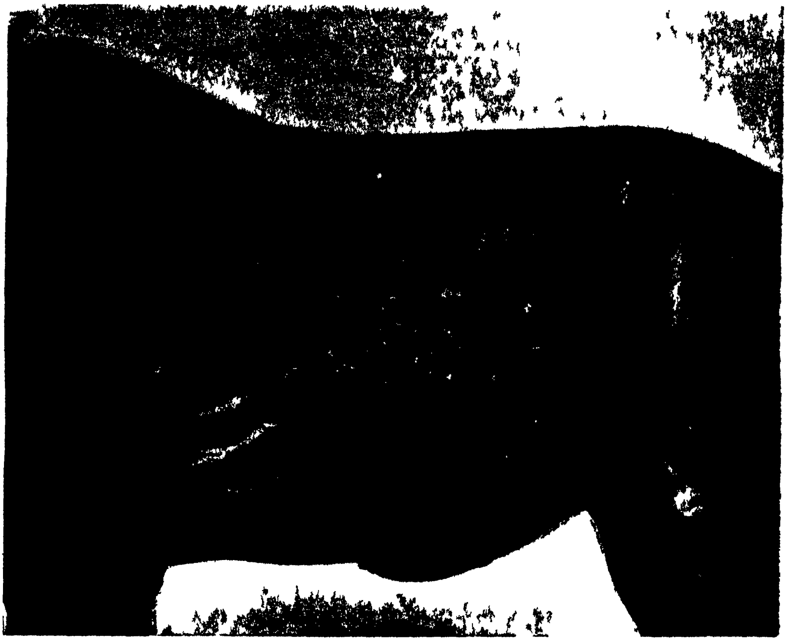
Mode of Infection.—The general opinion of all observers is that the disease is due to local infection, and shows itself in the region of a pre-existing wound or abrasion of the skin, after an incubative period of from eight days to five or six months. The susceptible animals are the horse, mule, and ass. Nocard includes the ox. The mule is particularly susceptible.

"The growth of the organism at its point of entry depends upon many conditions, and the lesions are only noticeable when the Cryptococci are penetrating into the connective tissue and neighbouring lymphatics. The resistance of the tissues is very great, and the phagocytosis very considerable. In exceptional circumstances the organisms are carried by the blood stream, and form specific lesions in the lungs."—(Nocard.)

It can be communicated artificially by subcutaneous or intravenous inoculation.

Mr. Goodall reports a very interesting case which he was able to observe from the commencement. There had been two cases of Epizootic Lymphangitis on this farm previously, which were isolated while under treatment. While the second case was being attended to, the owner drew Mr. Goodall's attention to a small cut about an inch long, on the stifle joint of a chestnut gelding, which looked as if it had been produced by a kick. About four days afterwards the owner informed him that little lumps had appeared round this cut. He at once operated, but before a cure was effected the lesions had extended up to the groin and down to the hock. The external lesions in this case were so like those of Farcy that Mr. Goodall often felt a doubt whether the mallein which he had used to test the animal was really reliable. He is convinced that the infection was carried to this gelding direct from a mare which was under treatment at the same time. This shows the necessity of exercising the greatest care in thoroughly disinfecting everything that has been in immediate

Epizootic Lymphangitis, showing ulcerated lymphatics on the neck



Epizootic Lymphangitis, showing ulcerated superficial glands and corded lymphatics.

contact with an animal affected with this disease—such as harness, rugs, brushes, sponges, etc.—and that the groom who attends to an affected animal should thoroughly clean and disinfect his hands before touching healthy animals, more especially dressing any wounds on other animals.

Another interesting case which also occurred in Mr. Goodall's experience was that of a mare which foaled shortly after she began to manifest the external lesions of Epizootic Lymphangitis. In this case, although the foal ran with its dam for several months, until she became hopelessly bad and was destroyed, the foal never became affected.

This disease existed in the Cape Colony before the war, more particularly in some of the eastern and north-eastern districts. It was described as "Tick-farcy," as it was generally believed that ticks were a medium of spreading it. It was early recognised as contagious, and subsequently differentiated from Farcy by the application of the mallein test.

But although this disease existed in the Colony prior to the war, it is very probable that a large number of cases were introduced during the campaign, and the presence of these affected animals amongst the large troops of horses which were congregated together in the military and concentration camps would lead to its rapid spread and wide distribution throughout the Colony, when the military horses were finally disposed of. In fact, this is what did occur, for the officers of this Department have met with numerous cases of the disease all over the Colony since the close of the war.

Symptoms.—Mr. Goodall describes them as follows:—

"In a well-defined case there is swelling of the lymphatics of the skin, and their subsequent corded appearance which is so characteristic of Farcy. Very often the nearest group of lymphatic glands becomes swollen and painful; small nodules appear on the swollen lymphatics, varying in size from a pea to a hazlenut, these burst and discharge a thick creamy pus, which always contains the Cryptococci in large numbers.

"Afterwards the suppurating points persist as small ulcers or buds with raised, thickened edges, which are constantly discharging a yellowish, sticky exudate. It is owing to this latter characteristic, I presume, that some observers have called the disease Ulcerative Lymphangitis."

Treatment.—Veterinary Surgeon Freer reports that this disease has been eradicated from the stables of three firms in Port Elizabeth without the loss of a single animal. This success he attributes to the care with which his instructions were carried out by intelligent attendants. He says in cases where the disease is localised, and treatment adopted early, it is usually successful, but if the disease is generalised before treatment is commenced it is rarely successful.

Veterinary Surgeon Paine (Elsenburg College) refers to two cases in which the lesions were confined to the nasal mucous membranes, the diagnosis being confirmed by microscopic examination, but treatment was hopeless, as it was impossible to operate on all the lesions.

Some difference of opinion exists as to whether the disease is a purely local affection, or systemic as well as local. As already remarked, the late Mr. Nocard stated "that it is only in exceptional circumstances that the organisms are carried by the blood stream, and form specific lesions in the lungs."

Naturally those who believe that it is a systemic disease, consider that the administration of internal remedies is as essential to successful treatment as the careful application of local remedies. In practice, however, this theory does not hold good. A large number of cases have been cured by local treatment only, whereas, without such treatment, the internal administration of iodide of potassium or the salts of mercury, even when pressed to their utmost toleration, have very little effect in arresting the spread of the disease. This fact, however, does not nullify the beneficial effects claimed for the internal administration of the salts of iodine and mercury in the treatment of Epizootic Lymphangitis, because the beneficial action of these salts in other diseases, in which the morbid lesions are confined to local organs, has been clearly established.

All are agreed that it is of the utmost importance to successful treatment that every diseased lymphatic should be laid open as far as the diseased action extends, their morbid contents cleaned out, and the parts thoroughly dressed with a strong caustic, such as pure carbolic acid. Several members of the staff applied the actual cautery to the opened lymphatics during their earlier experience of the disease, but most of them now rely upon a first dressing with pure carbolic acid, if it is thoroughly applied, the subsequent dressing being either a solution of carbolic acid, corrosive sublimate, chinosol, or similar strong germicide, the parts being covered over with a dry dressing, consisting of iodoform, boracic acid and starch. Mr. Goodall, who favours the view that Epizootic Lymphangitis is a systemic disease, states that in one of the most advanced cases that he had seen, and which was destroyed on his recommendation, the animal kept in good condition to the last and always fed well, and he adds, "that is a point I have noticed in several bad cases since, and, personally, I have never encountered that emaciation described by some observers." This has also been the experience of the other members of the Staff.

Preventive Measures.—Mr. Goodall says "that too much stress cannot be laid on the fact that, whenever an outbreak of Epizootic Lymphangitis occurs, careful disinfection of everything connected with the animal should be carried out if the disease is to be stopped from spreading. I am of opinion that the causal organism is a very resistent one, and retains its vitality for a long period, even on the harness, reins, rugs, etc."

The following are the regulations which the Inter-Colonial Veterinary Conference, held at Cape Town in May last, agreed to submit:—

(a) The owner or person in charge of an animal affected with Epizootic Lymphangitis shall carry out any course of treatment prescribed by the Government Veterinary Surgeon. Such animal to be kept isolated while under treatment.

(b) If, in the opinion of the Government Veterinary Surgeon, the affected animal is incurable, the said animal shall be slaughtered by order of the Government.

(c) No horse, ass or mule, shall be allowed to enter a stall which is occupied by an animal suffering from Epizootic Lymphangitis, and no horse, ass or mule, shall be allowed to enter a stall which has been occupied by an animal suffering from Epizootic Lymphangitis until the said stall has been properly disinfected.

(d) No owner of, or person in charge of, a horse, ass or mule, suffering from Epizootic Lymphangitis, shall take the said animal, or allow the said animal to be taken, into any stable or place used for horses other than his own.

(e) No litter or harness, and no stable article whatsoever which has been directly or indirectly in contact with any animal suffering from Epizootic Lymphangitis shall be used in connection with any other equine animal, until the said article has been properly disinfected.

In all cases of Epizootic Lymphangitis it is advisable to apply the mallein test in addition to the microscopic examination of the purulent matter, as a means of accurate diagnosis, as the local lesions of Epizootic Lymphangitis and Farcy resemble each other so closely in many cases.

STRANGLES OR NIEUW ZIEKTE.

" Strangles is an infective catarrh of the upper air passages of the horse, accompanied by suppurative inflammation of the neighbouring lymphatic glands, which generally leads to abscess formation. The disease is often complicated with metastatic abscesses in distant organs and lymphatic glands, the virus being carried thither by means of the blood and lymphatic circulation. One attack gives an immunity for years, perhaps for life." (Bowhill)

The infective agent is the *Streptococcus* of Schutz. It is found in the pus obtained from the abscesses in the lymphatic glands. It occurs in more or less long bundles of chains like strings of beads. Individual cocci in the chain sometimes appear larger than the others.

" Horses inoculated with pure cultures acquire abscesses at the point of inoculation. Inoculation into the mucous membrane of the nose causes typical purulent nasal catarrh, with accompanying inflammation and enlargment of the lymphatic glands.

" Mice are also susceptible to infection when inoculated, an abscess forming at the point of inoculation, accompanied with metastatic suppuration throughout the course of the lymphatic and blood circulations. Field mice are immune to Strangles, but highly susceptible to Glanders." (*ibid*)

Mode of Infection.—The infection of strangles takes place usually through the mucous membrane of the respiratory organs, but it may enter through the intestinal mucous membrane and according to certain authors it may be transmitted to the *fœtus in utero.* It may also enter through any abrasion of the skin, or be introduced experimentally through the same channel by inoculation. Young animals are most susceptible to infection, but it may occur in animals of any age which have not been previously affected. Other predisposing causes are any disease of the respiratory passages, such as a common cold, which produces a condition of the mucous membrane more favourable for the reception of the *streptococcus.*

The Persistency of the Contagion.—The infective agent of strangles appears capable of living for a considerable time outside the animal body, hence thorough disinfection of stables should always be carried out after an outbreak of strangles. It is due to this persistency of the infection in the stables of large companies and extensive breeding establishments, where young susceptible horses are being continuously introduced, that these fresh horses invariably contract strangles shortly after their introduction. This is usually attributed to the change of stabling, food, &c., but it is due mainly to the infection remaining in the stables.

SYMPTOMS OF ORDINARY STRANGLES.

Strangles commences like a common cold, the animal is dull and feverish, with a temperature of 104° Fahr., or over. The nasal mucous membrane presents a congested catarrhal appearance; there is a soft sneezing cough, soreness of the throat, and a difficulty in swallowing. The appetite is impaired, and in the large majority of cases, a swelling of the submaxilliary glands appears, accompanied by a discharge from the nostrils. This discharge is at first serous and viscid, but it soon becomes purulent. Its colour may vary from a dirty white to a yellowish green, the latter being largely influenced by green food, the juice of which passes back through the nostrils. In young animals the discharge from the nostrils is generally abundant, whereas in aged horses it is often very slight. As a rule in the ordinary cases of strangles, as soon as the abscess bursts or is opened, the temperature falls, the swellings rapidly disappear, and the cavity heals up by granulation.

The local swelling of the glands and their surrounding connective tissue may increase in size until the whole of the intermaxillary space becomes filled, and it may even extend behind the posterior branches of the lower jaw. In some cases the deeper seated glands of the pharynx and surrounding tissues become inflamed, and the consequent swelling may press so hard against the opening of the larynx, that breathing becomes difficult or even impossible, and unless relief is given, the animal will die of suffocation. In by far the greater number of the ordinary cases of strangles, the swelling goes on to suppuration, and the formation of abscesses, wherever its situation may be. The cases in which we get dispersion and absorption of the inflamatory products are comparatively rare. The formation of an abscess is indicated by one or more soft spots appearing in the swelling. These are at first doughy to the touch, but they soon become distinctly fluctuating, indicating the presence of fluid. The skin over these spots becomes thin, the hairs fall out, and the abscess points, bursts, and discharges a thick yellowish white, creamy pus.

The deep-seated glandular swellings usually terminate in suppuration in the same manner, but they may burst inwards into the pharynx, or they may open partly inwards and partly outwards, and thus cause a fistulous opening into the pharyngeal cavity. A fistula may form in a similar manner from the submaxillary glands into the mouth, but this is comparatively rare. Cases of sloughing of the submaxillary glands have also been reported.

In some cases the abscesses become indolent and ripen very slowly, while in others, the fluid matter may become partly absorbed, and set up Septicœmia or Pyæmia, which is usually followed by multiple local abscesses, or the appearance of abscesses in different organs and tissues of the body; the virus being carried by the lymphatics and blood vessels. When this occurs it is called

IRREGULAR, COMPLICATED, OR MALIGNANT STRANGLES.

In such cases abscesses may appear in any organ or tissue of the body, such as the mediastinal and mesenteric glands; they have even been met with in the nervous centres. The symptoms in such cases are often very obscure, and the cause of the trouble conjectured largely from the fact that the animal has previously suffered from strangles.

Exceptional cases of strangles are said to occur which present catarrhal symptoms only, without suppuration of the lymphatic glands, but such cases could only be diagnosed as strangles by bacteriological examination. Ordinarily they would be looked upon as common catarrh, or, if the temperature were high, influenza.

Cutaneous Strangles.—Strangles sometimes presents the eczematous form and appears as a vesicular eruption, discrete or confluent, localised in certain regions, such as the shoulders, flanks, sides and breast.

The dimensions of the vesicles vary, from the size of a grain of millet to that of a maize seed, they are smaller the more numerous they are, and the rash is less intense. (*Lechainche & Jolly.*)

STRANGLES ABSCESSES IN THE WITHERS AND SUBCUTANEOUS TISSUES.

The formation of abscesses in the withers were extremely common in some of the camps during and subsequent to the war. This irregular manifestation was not due to any apparent external irritation acting on the withers. I was shewn a large number of cases amongst horses which had not had a saddle on, or done work of any kind for many months previous to the formation of the abscess. Neither could any abrasion of the skin be discovered to account for the local inoculation. Independent of that, the surprising thing was that the abscesses formed in the withers only, as if the organism had a specific affinity for the tissues in that region. I have often seen large abscesses form in the subcutaneous tissues in different parts of the body, in cases of irregular strangles, but this is the first time that I have seen such abscesses systematically form in the withers and in the withers only, and without any apparent existing cause, except infection. In the majority of instances their formation was not preceded by any discharge from the nostrils, or any other local appearance of strangles.

Eighteen years ago my attention was directed to a disease which was prevalent amongst horses in the districts of Alexandria, Lower Albany, and Peddie, which closely resembled Irregular Strangles.

It was characterised by the formation of abscesses in the subcutaneous cellular tissue on various parts of the body. Some of these abscesses attained an enormous size, and contained as much as two quarts of pus, which usually had a most offensive odour.

The Manner in which this Irregular Form of the Disease is Spread.

I am strongly of opinion that the infection was conveyed by ticks, which are very abundant in the districts where this form of the disease was principally met with.

Even if the ticks do not convey the infection direct, they injured the skins of the horses to such an extent in those districts, that the surface of the skin was broken and almost raw in many places, thereby rendering the inoculation comparatively easy when the animals rubbed against one another. But in whatever way the infection is spread, there can be little doubt that the disease is contagious, and is very difficult to eradicate from a troop of horses when once it has got amongst them. It has not been met with so frequently during recent years.

There are many other complications in irregular strangles, the lungs may become affected, due either to the descent of matter, when an abscess opens into the pharyngeal cavity, or to the infection being conveyed by the lymphatics.

Theropeutics.—The treatment of ordinary cases of strangles is usually very simple, as the mortality is small. Death is generally due either to the animal being placed in unfavourable surroundings, or is in a feeble condition, or serious complications become developed, or pyœmia supervenes.

If the horse is regularly stabled, he should be placed in a clean airy stable or box, by himself if possible, clothe his body, if the weather is cold, but see that he has plenty of fresh air without a draught. Hasten the ripening of the abscesses by apylying hot fomentations, poultices or hot cloths. But as it is difficult to keep these applications close to the swelling, a good dressing is a mixture of tar and fat. If the abscesses become indolent, a little blistering ointment rubbed on to the centre of the swelling will hasten the formation of pus, and the pointing of the abscess.

Opening the Abscesses.—Some difference of opinion exists as to when the abscesses ought to be opened, some recommend that they should be opened as soon as pus forms in them, while others are in favour of waiting until they point and are ready to open spontaneously.

I readily admit that the early opening of an abscess will relieve the pain and may reduce the temperature, but I am strongly of opinion that, if an abscess is fully ripe before it is lanced, and then opened freely, and the pus thoroughly cleaned out, the cavity will heal more readily, and there will be less liability to the formation of secondary abscesses than when the abscess is opened too early.

When the abscess is deep seated, and the swelling presses on the larynx, and seriously impedes the respiration, it then becomes necessary to operate and allow the matter to escape. In such cases, when the swelling is near the throat or under the parotid gland below the ear, it is safer to cut through the skin only with the lance, and then try to penetrate through the subcutaneous tissues to the abscess with the finger. The blood vessels are numerous in that region, and some of them may be cut, or the parotid gland or its duct may be injured. In those cases, in which there is a profuse discharge from the nostrils, accompanied by difficulty in breathing and swallowing, but no appearance of the abscess opening externally, relief is often obtained by steaming the head, putting carbolic, acid, Jeyes fluid, Blue gum leaves or turpentine in the boiling water. But to be of any real use the steaming must be kept up for a considerable time. A good plan is to place a bucket of boiling water into the bottom of a long sack, and insert the horses head into the mouth of the sack. Renew the boiling water frequently. Many farmers blow snuff up the horses nostrils to make him sneeze, or make him inhale the fumes of sulphur by placing burning sulphur on a shovel immediately under his nose, almost choking the animal. Sulphur fumes are, however, beneficial when used moderately and with judgment.

Another Colonial method is to take the horse out and give him a good hard gallop. This occasionally acts beneficaly by causing the abscess or abscesses to burst internally, but like many other rough remedies, it would be a dangerous proceeding in serious cases, and it cannot be recommended. After the abscesses are opened and thoroughly cleaned out, all that is necessary is to keep them clean and dress them with some antiseptic daily.

With respect to food: give bran mashes, soft green food, or meal gruel, and take the chill off the drinking water, as the cold water pains the tender throat. As medicine, put a teaspoonful of nitrate of potash, either in his mash or his drinking water, three times a day. The principal consideration, however, is to keep his stable sweet and clean and allow him plenty of fresh air. It is always a dangerous proceeding to attempt to pour fluid medicine down a horse's throat when he is suffering from strangles or acute sore throat from any cause.

If the disease appears among horses that are grazing on the veld, and the weather is mild, it may be unnecessary to do anything in the way of treatment, except in cases that are unusually severe. These should be taken up and attended to at the homestead, giving them soft food or gruel, lest the patients die of starvation, from being unable to bend the head to feed, or swallow properly.

In the ordinary mild cases, the constant grazing with the head down, assists in the expulsion of the purulent matter from the upper air passages. Should secondary abscesses appear in other parts of the body, they must be opened and treated in a similar manner, and kept clean by antiseptic dressings. In irregular strangles the animal should be kept separate from the others, as the matter which forms in these secondary abscesses is liable to become virulently infective. The patient requires to be well fed, and a tonic in the form of a teaspoonful of powdered sulphate of iron may be given daily; or in chronic cases a mixture of sulphate of copper, 1 drachm, and arsenic 3 grains may be given daily in the food.

THE AGRICULTURAL UNION OF CAPE COLONY.

EIGHTH ANNUAL CONGRESS.

SECOND DAY, WEDNESDAY, MAY 2.

(*Continued from page 812, Vol. XXVI*)

The Congress resumed its sittings at 9.30 a.m. on Wednesday, May 3rd.

The Chairman said when they adjourned the previous day, they had been discussing the Fencing Bill about to be brought into Parliament by Mr. Rubidge, and, as it had priority, they would proceed to discuss it.

The Hon. Secretary explained that the following resolution had been moved the previous morning:—

> "That this Congress desires to place on record its approval of the principle that the Fencing Act should be so amended as to give a definition as to what is a vermin proof fence, and would urge the adoption of the Amending Bill now before Parliament."

Mr. Rubidge said he was rather disappointed that neither Mr. Douglass nor the other gentlemen who opposed this matter were present, but with reference to remarks of the previous day he understood there was some talk of a baboon fence. They did not want a baboon fence, all they asked was that the Government define a dividing fence. The contention seemed to be that a farmer would be compelled to put up a vermin proof fence where it was not found necessary. That was a wrong impression. They would see the necessity for such an Act when the vermin began to prey on their stock. Mr. Arthur Parkes, a farmer residing in his district, had his farm properly fenced and he had not lost a single sheep, goat or lamb this year, whilst his neighbours who had not gone in for fencing had lost hundreds and were trekking away to save those that were left. If there was any doubt in the minds of delegates as regards the Bill he would be only too glad to explain.

Mr. Starke said he had always been a great advocate of fencing but the matter they were now tackling was rather serious. They were asked to define what a jackal-proof fence was. He thought it was rather a big thing to ask the Government to define it. The Government might define one now, which in five years' time might not be any good. Under the old Fencing Act, he was one of the first to avail himself of it. He would say that he did not know how a man could live on a farm successfully without having it properly fenced; but to say that fencing should be made compulsory was going a bit too far.

The Chairman at this stage read the Bill. He said Mr. Starke had raised the objection that it should not be made compulsory to have fences. He had considered it would be an unnecessary expense to the farms that did not require it. He would inform Mr. Starke that under the Act of 1888 they had power to make these fences compulsory.

The Hon. Arthur Douglass said his great objection to the Bill was that it applied to existing fences. That would be a great hardship on many farmers, because if his neighbour wanted to have what is called a jackal-proof fence and it was not necessary for his farm, it would be very hard on him to be asked to pay half the cost. Then again many farmers would bear him out in stating that a jackal proof fence had not been discovered. He thought a neighbour should not be called upon to pay half the cost unless the fence should abut on the mutual fence. Of course if a farmer erected a fence and his neighbour used it to put up an abutting fence, then he should certainly pay his share. If a man was an ostrich farmer and adjoined a sheep farmer who wanted a jackal proof fence, it was very hard on the ostrich farmer that he should be asked to pay half the cost of that fence. Mr. Rubidge had said that his Act did not require a barbed wire fence. He would ask him if he had ever seen anyone attempt to put up a jackal fence without using barbed wires ?

Mr. Rubidge . Yes, I have.

The Hon. A. Douglass : And has it been successful ?

Mr. Rubidge : Yes, it has.

The Hon. A. Douglass continuing, said the Fencing Act at present in force had been a great saving to the country and why not let it go on as it was ? He did not believe in rushing matters at all. The man who did not believe in jackal-proof fences, but believed in poisoning jackals, was doing a lot of good. His belief was that if farmers were not so fond of their dogs and went in more for poisoning jackals, they would succeed in doing away with them.

Mr. Starke said he was not against fencing, in fact he favoured it, but he would like to do away with the clause compelling the use of barbed wire.

Mr. Van Breda (Bredasdorp) said he greatly favoured fencing sheep farms to keep out the jackal, but he would not be complying with the wishes of the Agricultural Society he represented if he supported that Bill. He knew plenty of large farmers who held thousands of morgens of land and who kept it perfectly clear of jackals by the use of foxhounds. He thought it would come rather hard on them, after they had been to the expense of importing a pack of foxhounds, to compel them to put up fences when the hounds answered the purpose for which they were required very well. It seemed to him that this Bill would only suit districts where fencing had advanced considerably, but it would not suit his district, which was, as yet, in its infancy. The present Fencing Act was being introduced into Bredasdorp District, and he thought it would answer the purpose admirably.

Mr. Cilliers (Britstown) said that if the Bill could be made permissible, it would answer the purpose very well. If these compulsory measures were introduced, he feared there would be considerable opposition. In his district for instance, compulsory fencing would be a great hardship.

The Chairman enquired if the Fencing Acts of 1883 and 1891 made fencing of farms compulsory.

The Hon. A. Douglass replied that the Act of 1883 was divided into two parts. Under the one part, it is compulsory for the whole Colony to fence, that was, if they put up a fence abutting on a boundary then each farmer would have to pay his half share of the cost.

Mr. Rubidge said that the Hon. Mr. Douglass had advocated farmers going in a little more for the use of poison, and by that means they would get rid of the jackals. From the time he was eight years of age he had gone in for poisoning jackals, in fact he became known as the jackal poisoner in the district He did not think Mr. Douglass had used as much poison as he had. It was peculiar that when he wanted to kill all the jackals on his place that Mr. Douglass should want to breed them to infest his place again. Was that fair? Now Mr. Cilliers was a practical man; that was apparent from the way in which he grasped the subject. He stated that the farmers had started fencing in the Britstown District; now with his Bill he wanted to help these farmers, and if they were going to put up fencing in Britstown he would advise them to put up this fence stipulated in the Bill. He had recently had a letter from Vryburg where cattle farming was mostly gone in for, in fact there were few sheep there, urging him to go on with his Bill. He could assure the farmers that if they adopted the fence suggested in his Bill they could say to the jackal "My dear Mr. Jackal, you keep away; let Mr. Douglass breed you if he wants to, but keep away from me." (Laughter). They had spent half a million of money on the destruction of jackals, and they were more numerous now than ever they were before; at least if they were not, they were much wiser.

The Chairman. They are availing themselves of the Education Bill (laughter).

Mr. Rubidge, continuing, said that he had no objection to Mr. Douglass breeding millions of jackals if he wanted to, but he wanted to protect himself from them. He could not understand any man like the Hon. Mr. Douglass trying to throw cold water on a scheme like this. He had already alluded to the barbed wire; and with regard to fox-hounds, every farmer could not keep them. He did not think any district would go in for fencing unless it was absolutely necessary. His idea was to increase the stock on the land, and instead of sending out of the country millions for food, etc., to keep that in the country. They had had a deputation to the Prime Minister, and he assured them that if the Bill went through, the Government would give all the assistance they could.

Mr. Fincham said he would like to say a few words on this very important subject. He was very sorry that Mr. Rubidge had left before he had had his say as delegate from the Queenstown District. In the district there was as much fencing as there was in any other part of the Colony. He was not prepared to support that Bill, his principal reason being because vermin proof fencing was not considered to be effective. It had been plainly shewn to them that vermin proof fencing was not vermin proof at all. He held with Mr. Douglass, that, from a pastoral point of view, the Fencing Act at present in force had been a great success, in fact he did not know how it was possible for any farmer to farm without it. His advice was to let well enough alone. If they began to interfere with things, as was suggested in that Bill, they would stop the progress that was now being made. If the district which Mr. Rubidge represented wished to have compulsory fencing, let them introduce a Bill into Parliament for themselves. They in their district did not believe in vermin proof fencing. He had received no direct mandate from the people in Queenstown District to oppose this matter, but he knew that if he voted for it he would get a very cold reception when he returned. He feared that if they passed that Act they would put a stop to fencing which was so rapidly increasing in the country. As the delegate of Queenstown, he was not at liberty to vote for the bill.

Mr. De Wet (Robertson) said the Bill would not get his support, and he thought they were only wasting the time of the Union in discussing it. He would have liked to have asked Mr. Rubidge, had he been present, how the jackal proof fence would work on farms through which a couple of rivers were running. It would be absolutely useless, and why should a farmer be compelled to erect a fence when there is no chance of keeping vermin out of his farm? He really thought it was useless discussing the Bill any further; he could not give it his support, and he hoped the Congress would not do so either.

Mr. Krige (Stellenbosch) said that if a person wanted a fence like that defined in the Bill which Mr. Rubidge is introducing into Parliament, he presumed there was no law in force to prevent him having it.

Mr. Cilliers (Britstown) moved the following resolution:—"That this Union hereby expresses its support to the Bill to amend the law relating to dividing fences, introduced by Mr. Rubidge M.L.A., on condition that it be made permissive throughout the Colony, including those districts in which the present Fencing Act has already been proclaimed."

Mr. Thomas seconded the motion. He regretted that Mr. Rubidge was not agreeable to make the Bill permissive. It would be very unfair to the farmers to compel them to put up such a fence as was stipulated in the Bill.

Mr. Hobson (Aberdeen Road) said he had listened to the arguments advanced against this Bill and he had heard one gentlemen after another stand up and say that this Act was compulsory, but this Act was an amendment to the original Act, and the original was permissive. If this was an amendment to the original Act, unless there was an amending clause put in it would also be permissive. The procedure with regard to the old Fencing Act was this: if one wanted to fence in the district, they had to go to their neighbours and get them to agree to the fence, and then the powers of that Act were introduced into the district; therefore, it was permissive. He thought that the definition of the dividing fence, included in the Bill in which it gave certain measurements, was a very necessary provision, as it would settle the matter between two farmers who had decided that they would erect a vermin proof fence between their properties. Up to the present there had been no definition of what that kind of fence should be. Now, on the practical experience of farmers who had to farm, such a definition was necessary.

Mr. Krige (Stellenbosch) moved an amendment to the effect that since the existing Fencing Act was quite satisfactory, there was no necessity for the Bill Mr. Rubidge was introducing.

After further discussion the resolution proposed by Mr. Cilliers was put and carried. It was further resolved that the chairman sign a petition in the words of the resolution to be presented to Parliament by Mr. Henry Wood.

INOCULATION OF THE SOIL WITH NITRO-CULTURES.

Mr. Ryan, then proposed the following:—"That this Congress would respectfully urge upon the Government the necessity for the cultivation and distribution in this Colony, of the nitrogen fixing bacteria for the inoculation of the soil, as now in practical operation in America." The object of this motion required a little explanation. Although this was rather an old matter, still the introduction of nitrogen fixing bacteria was a new development. They all knew how crops of peas, beans, etc., enrich the soil, hence they took their place in the rotation of crops. That being the case, it had been questioned by experimentalists why these crops should have that power, and it was found that the nodules on these plants had the power of attracting nitrogen. That fact was recognised, but scientists were further ambitious to see if it was not possible to cultivate this. Germany was the first in the field to manage this. Germany managed to cultivate this bacterium and they went so far that it was put on the market, patented and sold to the farmers. Although there were a good number of successes, the failures were so great that it had to be withdrawn from the market. There things remained for a time, until America, seeing that there was something in it, in their very thorough manner went into the matter, and the reason why the bacteria did not act was ascertained, and they have now managed to make it successful. In America it had now been in use for some time, and had been found most beneficial. A small quantity had reached this Colony, and Dr. Nobbs had kindly undertaken to look after the experiments. He did not see why their Department should not take the matter up, because they all knew that nitrogen was one of the dearest fertilizers, and, if they could get it from the atmosphere without having to pay for it, it would settle a very difficult matter. Surely it was worth their while trying, and if they had gentlemen in the Department of Agriculture who were willing to try it they should get every assistance. Of course to try it funds would be required, and the matter had been put on the agenda to assist them in getting these funds. He did not see why their Department should not move in that direction. If it was successful, it would mean the saving of a vast amount of money to the farmers. It would be a great thing for the farming community if they could give them bacteria that would fertilize the soil and save the expense of nitrogen; it would go a long way to stop the great importation that is at present being carried on. As he did not anticipate any opposition, he would formally move the resolution on the Agenda. This was a subject, he felt sure, that would appeal to every farmer.

The Chairman said he would like to have some statistics with regard to the subject. He would also like to hear Dr. Nobbs.

Dr. Nobbs said he did not want to labour this subject, as the meeting had a lot of work before it. He could endorse, from his own personal knowledge, all that had been said by Mr. Ryan. There was no doubt but that by using nitrogen they would get much larger crops than they did. Other countries had used it very successfully. The matter had passed the experimental stage, and there was no question about its success. The question, of course, naturally arose as to whether what was successful in America would be successful in South Africa. Of course it would be necessary to experiment at first before a definite reply could be given. It was only for that reason that the funds were required. He was sorry he could not give the Chairman particulars of statistics, but the figures which would be published in America could not be considered as a guidance for this Colony. The attention of the Department of Agriculture had been on this matter for a long time, and the Department had already ordered supplies of the bacteria from Germany and America to distribute to a few farmers who would take care of it, and experiment with it. Through Mr. Ryan's own enterprise, some of the bacteria had already landed here, and was being experimented upon. In view of the fact that the stuff was ordered by the Department, he thought it would be advisable to carry through this resolution, but at the same time he would be glad if the Congress could see its way to alter the resolution to the effect that it was desirable to spend money for this and other experimental works. They had been cut down to a minimum at the present time, and a vote of money, as suggested, would be very handy. If the Union could adopt the resolution, asking the Government to grant funds in aid of this, it would be doing good work.

After some further discussion, the following resolution was carried unanimously :—"That this Congress would respectfully urge upon the Government the necessity of making liberal provision on the Estimates for Agricultural Experimental Research generally, and would specially desire investigation of the question of nitrogen fixing bacteria."

The Right of Dual Entry.

An application was made by the Port Elizabeth Agricultural Society for an expression of opinion as to whether it was advisable to permit harness and saddle horses being entered for more than one class. The Hon. Secretary said that this matter had been sent forward by Port Elizabeth. The practice varied at various shows. At Port Elizabeth they did not allow one animal in more than one class. There was no good having much discussion on this subject, as it was a very simple question.

Mr. Starke favoured the attitude adopted by Port Elizabeth. It was inconvenient at shows to allow animals to be entered in more than one class. Of course there were certain classes in which they could compete, such as leaping, etc., but, when judging was being carried out in several classes at the same time, it was very inconvenient to allow a horse to enter for several classes at the same time. Mr. Christian (the late President of the Union) and other gentlemen always favoured only one class for one animal.

After lengthy discussion, the Hon. Secretary moved the following resolution:—"That it is not advisable to permit harness and saddle horses for more than one class, championships excluded."

Mr. Butler moved a direct negative. In up-country shows they had to depend upon the gate, and the great thing at these shows was the class for horses.

Mr. Brown's motion was seconded by Mr. Starke, whilst Mr. Michau seconded Mr. Butler's. Mr. Butler's motion was carried by 18 votes to 13.

OCEAN FREIGHTS ON MACHINERY AND IMPLEMENTS.

The Congress next proceeded to discuss a motion on the Agenda urging the necessity for a reduction of ocean freights on machinery and implements.

The Chairman said they all knew that the Government were telling them every day that they were carrying agricultural implements at the lowest rate possible on the Railway. His own opinion was that the Railways should be run for the benefit of the country, and not so much for Revenue. They should do as was done in Australia, where the Railways did not pay on paper, but they did in assisting the country people to get agricultural implements up-country at a great saving. He hoped the Government would see its way to make further reductions in the freightage on agricultural machinery, and if they did that they could easily go to the shipping companies and ask them to make some reduction. He would move the following resolution:—"That this Congress urges upon Government the necessity for a reduction in ocean freights on machinery and implements." The motion was adopted.

VISIT OF H.E. THE GOVERNOR.

At mid-day His Excellency the Governor made an official visit to the Congress. He was received by the President (Mr. Struben), the Hon. Secretary (Mr. Brown), and the Mayor of Cape Town (Mr. H. Liberman).

The President said he did not think it was necessary for him to introduce His Excellency the Governor to the Congress. They were all aware of the great interest he had always taken in agriculture in this country, and he had done his best to further the interests of Agricultural work. As he understood His Excellency wished to address a few words to the meeting, he (the President), did not intend to make a speech, but would formally introduce His Excellency.

His Excellency the Governor said he had not come there with the intention of making a speech; he had merely come to welcome the delegates to Cape Town and to Cape Colony, and to say that it gave him pleasure to think that their work was of such a nature, and he wished them all success. Speaking before an assembly of experts in agriculture like that was, it would ill become him to make any suggestion or recommendation to them. They knew a great deal more about the business they had gathered there to discuss than he did. All that he could say was that he took a very great interest in agricultural undertakings in South Africa, and he hoped their deliberations would be crowned with success. He could assure them that he had always endeavoured to the best of his ability, in his own private capacity, to encourage pastoral and agricultural enterprise in South Africa. He had always tried to obtain for his house and his household, articles produced in South Africa, but he was bound to inform them that he had not always succeeded. About ten months ago he had occasion to complain of the quality of the mutton supplied to Government House. He sent his aide-de-camp to the butcher to complain, the butcher expressed his deep regret, but explained that as no Canterbury mutton had arrived from New Zealand, he had had to send Argentine. One would think that there was not such a place as South Africa in the world. The other day he tried to get some South African lucerne for his horses, which they preferred; his aide-de-camp tried to get it, but was informed by the dealers that there was none at present, but they hoped to get some within the next few months. He hoped that the result of their gathering would be to obtain South African produce at a proper price. There was another subject he would like to mention, and that was the subject of co-operation amongst farmers. Co-operation had been a great deal talked about; it had been talked about so much, that he was beginning to get shy when mentioning it. People mentioned co-operation as a kind of Mother Siegel's Syrup, or a kind of Holloway's Pills, that was a cure for all illnesses. He believed in co-operation, but he thought that a great many who spoke of it did not clearly grasp what it clearly meant. Now, there were a great many co-operative societies in England, but they were no more co-operative than the wall was. There was one, the Army and Navy Co-operative Society. It was an extremely large and successful undertaking; in fact, it was nothing else but an extremely large joint stock company. Owing to the fact that it sold for cash, and owing to the vast extent of its transactions, it was able to serve its customers at a cheaper rate than the ordinary shops. In the true co-operative society the capital should be limited, and a fair interest paid on the money invested. Now, in England the real co-operative society did not pay more than five per cent. on the money invested, but, of course, that amount could be increased here, as money is dearer. The balance of the profits should be divided amongst the customers. He just wished to mention the instance of a well-known co-operative society in England—the Western Counties Agricultural Co-operative Association, which was started some years ago, and with very small capital; the rule limiting the profits was adopted, and any farmer was allowed to deal with this society by taking part of a share. He believed part of a share could be got for 10/-. Well, the first year's work was not very encouraging—the whole turn-over was less than £20,000, but three years ago the turn-over was £400,000, and during the years it had been working it had paid out something like £70,000 to the farmers. This society had been established to give the farmers agricultural implements at a lower rate than they would have to pay in the shops, and as they did such a big business now, they could employ experts to see that what the farmers bought was the best that could be obtained. Supposing he was to start a farm now—in which case he presumed he would be ruined (laughter)—and he wanted to purchase artificial manures he would first of all have to pay a chemist to tell him what sort of manure he required. He would then have to go to the dealer to get the manure, and even then he would not be sure that what he got was correct. Now, the expert of this society would tell him exactly what kind of manure he wanted, and would also analyse it for him; that was one instance of the good such a society would do. The society would be limited to the purchase of things for farmers, and there was no reason why there should not be societies to enable the farmers to dispose of their produce. It was very difficult to get at the root of things, but he had heard that the farmers could not get rid of their fruit and vegetables, whilst he, the consumer, could not get vegetables or fruit even at high prices. These were platitudes, and he hoped he would be forgiven for using them, but they were very important. There is one other subject which he recollected referring to at Port Elizabeth last year. It was with regard to letting the merchants live. On that occasion he overheard one man saying to another, "It's all very well, we are the people who supply the farmers, and we don't want to interfere with them." He considered that they should live and let live. The merchant was not to be done out of all his profit, but he believed that by this system of co-operation the consumer and the farmer would be brought more together, and that the farmer would benefit by the sale of his products. He concluded by again welcoming the delegates. (Cheers).

The Chairman introduced Sir Lewis Michell (Acting Secretary for Agriculture) and the Mayor of Cape Town (Mr. H. Liberman). Sir Lewis Michell, he said, was, as they were aware, the Acting Minister for Agriculture. Mr. Fuller, the Minister for Agriculture, had gone to Europe to undergo an operation; and in the meantime Sir Lewis Michell was acting in his stead. He might say that though Sir Lewis Michell had throughout his life been connected with careers other than agriculture, no man could have done more in the matter of assisting the farmers than he had. He wished to mention that, and he also expressed the hope of obtaining further benefits from the Agricultural Department. In the name of the Agricultural Union of the Cape Colony, he wished to thank His Excellency the Governor for the great encouragement and advice he had given them. He (the Chairman) was the last man in Africa who wished to find fault with the Government, but there were various ways in which they could be of help to the farmers. They did not wish the Government to do more for them than other Governments did for their countries. This was a country of long distances; this was a country of vicissitudes, and the farming community was not a wealthy one, and had to consider expenditure carefully. He did not wish to make a long speech, but he wished to say that the matter of experiment stations was one that the Government could spend a little money on. There was also the question of forestry. He regretted to say that, owing to the unfortunate state of the finances of the country, the amount for the vote for forestry had been reduced. If money could be spent in any way to advantage in this country, it certainly was in forestry. As he had said before, the distances in this country were very long, and the Government could assist them to shorten them. The railways in this country were not run by companies; they were run by the Government. He understood that agricultural implements, etc., were being carried over the lines at the minimum rates, but he hoped the railway would be able to reduce those rates over the long distances. He would not take up the time of the Congress further, but he would conclude by thanking His Excellency for his words of encouragement, and for the great interest he had always evinced in agriculture.

The Mayor of Cape Town (Mr. H. Liberman) said he had much pleasure in welcoming the delegates to that chamber. He did so on behalf of the citizens of Cape Town. He did not think it had been occupied for some time past by a more useful body of men than the Agricultural Union. They all acknowledged that the success of the farmers was the success of the townsmen; and if they could only bring the farmer to know that the townspeople had the interests of the farmer at heart, it would do a lot of good. In a country like this it was the duty of every townsman to assist the farmers as much as possible. The Chairman had made it pretty plain that they could not expect too much from the Government. That was true; therefore, it was the business of the farmers and the townspeople to assist one another. He had been in the produce business for some time, and he knew that the slightest increase in the railway rates meant a considerable increase in the price of produce. He thought the Government should reduce the rates, although it might be a loss to the revenue of the country to do so; still, the money would be spent in the Colony, and that was a great thing. The Chairman had also made it pretty plain with regard to the carriage on implements. He thought the Government should import seed for the farmers if they could manage to do it cheaper than the merchants. That had been done in Australia, and there were now 400 kinds of wheat there, whereas in this country there were not 40. He could assure the farmers that if they did not work they would not get on. The farmers led very different lives in this country; one farmer got up early in the morning, drank his cup of coffee, and sat on the stoep smoking his pipe, whilst his more ambitious brother was out counting his sheep and lambs. Getting up early was all right, but the question was how was the time afterwards spent? One man was contented with his lot, whilst the other was eager to get more. It was a bad thing to be contented. The man who was contented was of no value to his country. It might be a sin to be discontented, but it was a sin that would be forgiven. The farmers should not depend entirely on the Government, because the Government could not do everything for them. He saw by the report of the previous day's proceedings that the question of the poultry industry had been gone into; now that was a most important industry, and if the people only knew the quantity of eggs and poultry imported into Cape Colony in the year, they would not think so little of the industry. If they went down to the Cold Storage, they would see thousands of poultry there, all of which had been imported. He had had the pleasure recently of presenting an address to Lord Milner. Lord Milner pointed out that although they had gold and diamonds in the Transvaal, they should also encourage agriculture. Now in this Colony, agriculture was their backbone, for they received very little benefit from the gold and diamonds. His Worship concluded by again welcoming the delegates.

Sir Lewis Michell said he felt that the Agricultural Union should not visit Cape Town without receiving a word of encouragement from the Government. He had to apologise for coming there. He was not a practical farmer and, until very recently the only land he owned was a burial plot (a laugh). He had never had time to study agriculture, in fact he was more used to currency than he was to crops. When his friend Mr. Fuller took ill, he took up the position of Secretary for Agriculture for him. Since then he had found out a lot of things about the Agricultural Department. He had found that the Agricultural Department could be a blessing to the country or a curse. There was a Bill before Parliament at the present time—he referred to the Agricultural Bill—he was not going into that at that stage, but he could assure the Union that the object of the Government was to reform the Agricultural Department. The first thing he saw when he took up temporary office, was in one office nine pens stuck in an inkstand. He did not think there was so much necessity for all these pens. The objects of the Agricultural Department should not be merely to write and receive letters, but to get into touch with the farming population. Now, one of the most important functions which the Agricultural Department had before it was to eradicate scab in this country, and to go further there were plant diseases which had to be dealt with, the encouragement of forestry, etc. All these were functions of the Agricultural Department, and could only be carried out when proper reformation had taken place. He could tell them this: he would give the Congress his and also the Government's assurance that the Government recognise the value of agriculture in all its branches, and they would do all in their power to further it. They also intend doing all they could to put the Department of Agriculture in a proper state of efficiency.

Mr. Fincham, Vice-President of the Agricultural Union, said he had been asked to propose a vote of thanks to the Mayor and Sir Lewis Michell. With regard to the latter, he was very glad to hear what he had to say about the future intentions of the Government. The fact of Sir Lewis Michell's presence at the Congress in his Official capacity, was an additional assurance that it was the wish of the Government that agriculture should go forward. It had been said by the President that they were widely spread over South Africa. He thought that there were no delegates there who would not go home thoroughly satisfied with what they had heard. He concluded by thanking Sir Lewis Michell and the Mayor for the interest they had shewn in the working of the Union.

RAILWAY RATES ON PEDIGREE STOCK.

The next matter discussed by the Congress was the advisability of asking Government to convey imported pedigree stock on the railway at the lowest possible rate.

The Chairman said he did not think that the Congress would discuss this matter at very great length, because there were very few men in this country who could afford to import pedigree stock. They cost a great deal at Home, and when they came here, the expense of importing them was very high. After they were landed, there was the expense of transporting them up-country. He spoke very feelingly on this subject, because he had purchased a lot of imported stock and the charges for sending it up-country were very high. He thought that where it could be proved that pedigree animals were fit for introduction to the Stud Book, there ought to be a special rate for them, as against butchers' stock and speculative stock. If an animal was imported and registered in the Stud Book, their was fair evidence that it was an expensive and good animal, and the introduction of this class of animal should be encouraged.

After some discussion,

Dr. Hutcheon said the resolution was moved for the purpose of encouraging the importation of good stock. This was a very important matter, and a good deal depended on the class of stock introduced, and whether they would tend to the advancement of the stock industry of the Colony. He did not think anyone would be in favour of advising the Association to pass such a resolution unless the cattle imported would improve the breeds of the stock in the country. Say a man consigned pedigree stock and put them up for sale in Cape Town, the difficulty would arise as to who could decide whether they would be of advantage to the stock of the country or not. The Government would want some power for preventing people from selling imported stock which would not do any good to the stock already in the country. If the Government acted on the resolution, they might see speculators importing pure bred stock—but all the same pure bred rubbish.

After further discussion in the same strain, it was decided to leave the matter in abeyance.

RAILWAY RATES ON MANURE.

The Western Province Agricultural Society submitted the following subject for consideration:—"The desirability of manures both imported and colonial being conveyed on the railway at the lowest possible rate."

After discussion the following moved by Mr. Malleson was carried:—"That imported artificial manures be carried over the railways at as low a rate as Colonial artificial manure, and that both be carried at as low a rate as possible."

DUTY AND RAIL CARRIAGE ON SPRAYING MATERIAL.

The desirability of placing spraying material on the same basis as sheep dip, as regarded duty and railway carriage, was brought forward by Mr. Malleson who said that this was also a very simple matter. The fruit-growers wished to be put on the same basis as the sheep-farmers, as regarded duty and railway carriage on their spraying materials.

Mr. Evans thought that crude petroleum, which was a very important thing for many farmers, should also be included in the motion. Special arrangements were made for carrying crude oil to these shores, and if they could get it up-country at a low rate it would be of great help to the farming community.

Mr. Malleson moved a resolution in accordance with his notice, which was seconded by Mr. Versfeld, and carried. The question of crude petroleum was deferred to the next day.

Congress then adjourned until Thursday morning.

THIRD DAY, THURSDAY, MAY 4TH.

The Congress resumed its sittings at 9 30 on Thursday morning.

CRUDE PETROLEUM FOR AGRICULTURAL ENGINES.

The Chairman said that when Congress adjourned the previous day they had discussed the second clause of the second Agenda Paper, and Mr. Mayo had been deputed to bring forward a resolution on the subject of crude oil being carried on the railways at a lower rate. He had now brought forward a resolution to that effect, and he (the Chairman) thought the matter did not require any discussion, as it had been fully discussed the previous day, and they all knew it was necessary.

Mr. Evans seconded the resolution, which was unanimously carried.

AFRICAN TICK FEVER.

The Congress next proceeded to discuss a notice on the Agenda urging the necessity for strong precautionary measures being taken to prevent the introduction of African Tick Fever into this Colony.

The Chairman said that as the Colonial Veterinary Surgeon, Dr. Hutcheon, was present, he would like to hear his views on the subject.

Dr. Hutcheon said that with regard to this Tick Fever, it might be of advantage to those present if he explained the position they were now placed in. As they were aware, African Coast Fever was looked upon a short time ago as one of the most dangerous diseases that had ever invaded South Africa. Dr. Koch's opinion was that it would spread through the whole of South Africa, notwithstanding every precaution that might be taken to prevent it; but, since then, their knowledge of the disease had increased, and they now found that it was not as bad as they anticipated it would be. At first they thought that it was going to be more serious, and more difficult to control than the ordinary Redwater had been; but they now found that such was not the case. It was a well-known fact that the infection of Redwater could be carried by "salted" or recovered cattle, but African Coast Fever could not. After an animal had recovered from African Coast Fever, it was no longer capable of communicating the infective organism to the particular ticks which fed on it; hence such recovered animals were no longer dangerous, and there was no necessity or advantage in killing them in order to eradicate the infection from a farm. If the disease appeared amongst the cattle on a farm, it is recommended that the owner should kill all the healthy cattle that are fit for slaughter in order to minimise his loss as much as possible. Then, if the farm is fenced, and no fresh cattle are allowed to stray on to it for a period of fifteen months, the ticks on the farm lose their infectivity by not having any susceptible or infected animal to feed on, and healthy susceptible cattle can then be introduced with safety. There is one point which has not yet been experimentally confirmed, and that is whether any animals other than cattle can carry the infection. The Redwater tick passes through its three stages on the same animal. The life cycle of the tick which carries the infective organism of African Coast Fever is quite different; it leaves its host at each stage of its development. Further, the infective organism of Redwater passes from the infected female tick, through the egg, to the larval tick. If this infected larval tick gets on to a bovine animal, it communicates the infection of Redwater to that animal, and as the tick remains on the same animal until its adult stage is complete—by which time the bovine host has developed the disease—the adult tick again contracts the infection from the same animal that, as a larval tick, it communicated the infection to. In that manner the disease passes on. But should the infective larval tick get on to a horse, mule, sheep, or goat—animals which are insusceptible and resist the infection of Redwater—that tick loses its infectivity; hence no animals other than cattle can convey the infection of Redwater. It is quite different with the tick which carries and communicates the infective organism of African Coast Fever. That tick has first to acquire the infective organism before it can communicate it. Should it get attached to an affected beast as a larva, it is capable of communicating the infection to a susceptible beast as a nymph. If it does not succeed in getting on to an affected animal until its second or nymph stage, then it can only communicate the infection to a susceptible animal in its third or adult stage. Now, the question arises, if the African Coast Fever tick acquires the infective organism in its larval stage, and gets attached to a susceptible animal, to which it communicates the infection as a nymph, has it then lost the power of communicating the infection to its third host, as an adult? Or, supposing the African Coast Fever tick acquired the infective organism from an infected beast as a larva, and got on to an insusceptible animal, such as a horse, sheep, or goat, as a nymph, would it be capable of communicating the infection to its third host, if a susceptible animal? The reply is, that all experience and observation points to the conclusion that, whether an infected nymph feeds on an insusceptible or a susceptible animal, it discharges the whole of its infective material, and loses its power of communicating infection. It does not, like the Redwater tick, remain so long upon the animal that it infects, to re-acquire the infection from it. It is very difficult to experimentally prove this, but Mr. Lounsbury's experiments have all proved negative, and consequently support the general experience. There is a growing conviction, therefore, that no animals, other than cattle, are capable, under ordinary conditions, of carrying the infection of African Coast Fever. In framing regulations for preventing the spread of such a fatal disease as African Coast Fever, however, we could not afford to take any risk; hence we prohibited the introduction of any animals capable of carrying ticks from an infected area. We felt justified in doing this, because Mr. Lounsbury had experimentally shewn that the Bont tick, which is the active agent in carrying and communicating the infective agent of Heartwater, and whose life cycle corresponds very closely to that of the tick which communicates African Coast Fever, is capable of carrying the infection from the larval to the adult stage, even if it has fed on an insusceptible animal as a nymph. We are, therefore, in hope that we may be able at an early date, to considerably relax the restrictions which are at present enforced against animals that are non-susceptible to the disease. There is another point over which some of the farmers in Griqualand West and Bechuanaland are seriously exercised, and that is that the Government have relaxed their restrictions, and are allowing cattle under certain regulations to come in from the Protectorate. He could assure the delegates that before the Government did so, they had taken the precaution to obtain reliable information respecting the health of the cattle in the Protectorate, and the entire absence of African Coast Fever from that territory. Considerable credit was due to the Protectorate officials and to the

Native chiefs for the way in which they had carried out their stringent regulations. They had succeeded in keeping the disease from getting into their territory from the north—although it had been on their border for over three years; and they were equally vigilant in keeping it from entering from the Transvaal. Further, the Protectorate now had a veterinary surgeon who, up to a short time ago, was in the employment of the Colonial Government. He was a most efficient and reliable professional officer, and one in whom he (Dr. Hutcheon) had the very greatest confidence, and he knew that in his position he would study the interests of the Colony as much as he would the interests of the colony he now served, and he was confident that if there were any disease up there, or any danger in letting cattle come in, he would instantly let this Government know. He told this to the delegates because he wanted to assure them that he was not taking a step in the dark in recommending this relaxation of the regulation. The cattle were allowed to come into the Colony after being dipped. There was really no necessity for the dipping, but it was an additional precautionary measure But if there were any fear that the disease existed in the Protectorate, they would not trust to dipping, but would stop the importation of animals at once. If they had not given this permission, they would have had to guard the boundary—about 100 miles along the Molopo, where the cattle were being brought in illegitimately with the connivance of the people of Bechuanaland themselves, and it would take a small regiment of police to watch that boundary. It was much better to permit these cattle to come in under strict examination and control, than to have them coming in illegally.

The Chairman said he would like Dr. Gunning to give the Conference the benefit of his experiences, especially with regard to the statement that at certain altitudes there was no fear of the disease.

Dr. Gunning said that he knew very little about the subject. It was stated at the last Conference that on the Hoogeveldt the disease died out.

The Chairman: "What part is that?"

Dr. Gunning: "That is a certain altitude that has not yet been defined."

The Chairman: "I suppose it is between 4,500 and 6 000 feet above the sea level?"

Dr. Gunning. "I should say it was about 5,000 feet." Continuing, he said that that was the statement that Dr. Theiler had made. The Director of Agriculture had informed them at that meeting that where fencing had been properly carried out, there had been no fresh outbreaks, and in many cases where the disease had been prevalent it was being rapidly wiped out.

The Chairman said that was practically what he had heard from people in the Transvaal. He had had a letter the other day, pointing out the immense benefit that had been derived in the Transvaal, which was a grass and cattle country, by a proper system of fencing.

Dr. Gunning said that the Director of Agriculture had also informed them that where fencing had been properly carried out, the disease had been confined.

Dr. Hutcheon said he did not think it was so much a matter of altitude as of temperature. They knew that certain degrees of frost killed the ticks. In this Colony there were numerous areas in which the disease never spread. It was carried there, but the ticks died. Districts such as Wodehouse, etc., had no disease. In the early days of Redwater, when it was introduced into Natal, and the traffic from every colony was all to Kimberley, it was an interesting fact that the cattle all round there had never been seriously affected with redwater. Certainly they found the organisms of Redwater in the cattle, but they never found anything like a serious outbreak, because the country was open and the weather there in the winter was so severe that it killed the ticks. The farmers in Bechuanaland, he believed, had very little fear of the Tick Fever, because of the immunity which their cattle have from Redwater, it is a comforting fact that they had never had African Coast Fever excepting where Redwater existed also. It was the combination of the two diseases that puzzled the early investigators and made them believe that it was only a new form of Redwater, especially as the disease had all the symptoms of the Redwater. They had ticks in Bechuanaland and Griqualand West, but they were not the ticks that produced Redwater or African Coast Fever. He just mentioned that to show that there was not such imminent danger in that part of the country.

Mr. Evans enquired if it was inadvisable to move cattle into Bechuanaland from the Bedford District, as there were large numbers being moved in there at present owing to the severe drought. When these cattle returned, was there any fear of their bringing the disease back, or being prevented from returning?

Dr. Hutcheon said that so long as that part of the country remained clean, they would not impose any restrictions against their return.

Mr. Evans said he would like to ask Dr. Gunning if he knew of a bird in the Transvaal which fed on ticks. They were large white birds and stood on the backs of animals, feeding on ticks. He had been told by a gentleman who had had his cattle covered by ticks, that these birds had cleaned them in a couple of weeks. If there was such a bird, would it not be advisable to try and cultivate it in this country? He thought the bird was called the Rhenostervogel.

Dr. Gunning said he had seen birds, like that described by Mr. Evans, in the Transvaal and they did a lot of good; they were called the tick-vogel. They belonged to the heron tribe and were migratory, and he feared that if they were introduced into this colony, that to keep them it would be necessary to clip their wings and that would prevent them from doing any good.

The Chairman said he knew the bird referred to. It was the Rhenostervogel, and it lived in the bush. He had seen them on the backs of koodoos and buffaloes eating the ticks. He also knew of a bird of the gray starling type, which completely cleared animals of ticks. In the old days before the railways, he used to send ox waggons down to Natal, and the cattle would come back covered with ticks, but they would be cleaned in a couple of weeks by these birds.

Dr. Hutcheon said there seemed to be some misconception about the matter under consideration. They would find that if they brought cattle up from the coast and put them on the Karroo, the ticks would drop off them, and the place where the cattle grazed was so wide that the chances were that cattle would not pick them up again. It was only a case of finishing the life cycle of these ticks. He really did not see the advantage of introducing these birds. Of course he did not question, but that they might do some good.

Mr. Evans said that at Potchefstroom, where these birds were in large numbers, redwater was now unknown; whilst in the early days this malignant disease was very rife. Now in the Albany District, cattle were so badly covered sometimes with these ticks, that they could not see out of their eyes. He thought that if the birds were introduced into this district they might do some good.

Dr. Hutcheon said that in the Potchefstroom District, the cattle were immune against the disease hence no cases occurred amongst local cattle. He of course admitted that the birds would diminish some of the ticks, but they could not depend upon them to prevent ticks entirely and a very few are sufficient to convey infection.

Mr. Mayo said that he would like to mention that several of these birds had arrived in his district some months ago, and they seemed to be easily domesticated. When the others migrated, they left one of their number behind, and it was now living with the fowls.

Dr. Gunning said that as soon as its mate came back it would go away.

The Chairman said that if there was no further discussion on this matter, he would suggest that, whilst thanking Drs. Hutcheon and Gunning for their very valuable information, the Union should express the opinion that the question of the prevention of this disease could be left to the Veterinary Department. Personally, he thought they could leave the matter to them because Dr. Hutcheon had told them the cattle were being well looked after. They had also received from Dr. Gunning the assurance that the disease was dying out in the Transvaal. He believed that if they enforced too strict a quarantine, there would be unscrupulous people who would abuse it, and it was probably better to let the cattle go through recognised channels where they could be inspected. He thought that the discussion had been extremely useful and valuable. The question of the prevention of the spread of this disease was one that might have to be met with any day. In the Transvaal, the stock of cattle had been greatly depleted with Rinderpest and the war, and they were afraid that the rest were going to be carried away by this disease. Only for the inter-Colonial Council, the disease would have spread all over the country; and now, after all the trouble was over, he thought it would be advisable to leave the matter in the hands of the Veterinary Department of this Colony.

The Hon. A. Douglass said:—As far as the Government measures are concerned, they can be left in the hands of the Veterinary Department, but the farmers must also take some course to protect themselves. As long as we have the ticks to convey the diseases here, so long are we in danger of having African Coast Fever break out here, and I think this Society should not break up without drafting a resolution recommending the farmers in South Africa to get rid of the ticks. That is the only safety we have. It is in the power of the Colony to get rid of them. If you cannot do so altogether, you will reduce them considerably. I may say that on my own property seven years ago all my cattle were infested with ticks. I believe they were worse infected with ticks, than any other cattle in South Africa. It seemed to me that the cattle were going to die out altogether because the heifers when they calved down would have no teats, with the result that they had to be sent to the butcher. The ticks were so crowded on the skins of the cattle that they could not get sufficient room on them, so they took to the ostriches, I found them on the legs and wings of these birds, and they even got into the larynx, which is very forward in that bird, and they were gradually choking my birds. Now that was the state of things that existed on my farm seven years ago. Whilst experimenting for a cure, I found that paraffin was almost absolute death to the tick, if used as a spray. We went on and sprayed the cattle for a fortnight, and our efforts were so successful that we kept on until we got rid of the ticks; and now we have only an occasional tick, and my farm is 7,000 morgen in extent. I prevent ticks being brought in by never allowing cattle back on the farm once they have left it. We found that paraffin by itself in the wet weather had a tendency to blister the skin. I then patented a pump and mixed 25 per cent., of paraffine with 75 per cent., of water and used that. There is no blister and it means absolute death to every tick within a quarter of an hour after it has been applied. I gave an exhibition of the effect of this mixture of paraffin and water on ticks at one time to some farmers. I offered a pound for every live tick they caught if they would give me a (1/-) shilling for every dead one I got, but nobody would take me on. I then offered to take a penny for every dead one and give a pound for every live one, but even that was not accepted; and it was well for them it was not, because I would have taken money from them. The Government were now going in for dipping instead of spraying. As yet the dipping has been a failure. Dipping will not kill the aged female tick. I was talking to Dr. Hutcheon, and he bears me out in that statement. The only dip in use is arsenic. Now, the arsenic solution only affects the skin of the animal dipped, and consequently only kills the males and young ticks, because these only subsist on the juices that come from the skin, whilst the mature female tick after she becomes pregnant bores through the skin and sucks the blood, and consequently abstracts less of the poison. Many people say that by the use of arsenic they kill

40 or 50 per cent. of the females, but as a matter of fact, I don't think they do. I experimented with arsenic, but it was not any good. Paraffin is the only cure. The Government are now erecting public dipping tanks in certain centres. I think it is a very silly thing to get the farmers to go to any centre; it is the most foolish thing the farmers can do. Any man who is going to be a successful breeder of stock should not allow any of his cattle outside of his boundary fence nor any stock inside, except it is for the purpose of improving his herd; but to encourage the farmers to take their stock to these centres for the purpose of dipping, would be the surest way of spreading all sorts of disease. The tick infested cattle come in and the ticks drop off them and get on other cattle. Dr. Hutcheon will probably say they will only be brought when the ticks are nearly dead; that might be, but all the same they can infect. Unless you can get rid of ticks, you will not stamp the disease out. The Veterinary Department say "Oh! it can be done by dipping." You will kill the nymphs and larvas that come on within four days, and if you dip but once a fortnight, you can only catch those that have been on the skin four days; you don't catch the ones that have been on for the previous ten days, and that have matured. You want to get the females and prevent them from arriving at maturity. I determined, when I took the matter in hand, that if I succeeded in stamping out the females, that I would stamp out the disease. The ordinary farmer cannot afford to pay £150 for a dip, and then to fill it afterwards, and to encourage him to go to a common centre is very foolish. Well, now the spray and race will only cost about £10, and you can easily spray from 60 to 70 head of cattle per hour. I have a herd of 500 cattle, and they are all sprayed by 11 o'clock in the morning. Of course we commence very early. I say that spraying is the practical thing for the farmer. The first outlay is absolutely nothing; it is not necessary for every farmer to have a race but if he has a large herd he can have a race and recover the paraffin water that has drained off the cattle, and have it skimmed. Now I think that it is the practical way in which the ticks can be got rid of. Some people say :—But what about the cost of the spraying? Well it costs me from 1½d. to 2d. per beast, that is including labour and everything, and I do not think you will be able to dip for less than that. Perhaps Dr. Hutcheon will say you can, but you must remember the initial cost of the dipping tank and that has to be deducted yearly. We must not overlook the fact that arsenic is not an effective dip. There have been many cases of serious accidents with it. I have seen at Dr. Hutcheon's experiment station—

Dr. Hutcheon: Oh that was an accident.

The Hon. A. Douglass: So it would be with the farmers. Continuing, he said that at the experiment station they were using an arsenical dip; one pound of arsenic had to be used to 14 gallons of water, but the man who was mixing the dip used one pound of arsenic to 14 pounds of water. If that occurred at the experiment station, where scientists were all about, what could be expected from the farmers throughout the country? He only mentioned that to show what accidents might take place. They knew that in the Transvaal a farmer dipped 5 or 6 teams of oxen at the public dip, as the Government were encouraging farmers to do at Grahamstown now. He spanned them in again immediately after dipping. It was a warm day, and the heat opened the pores of the skin, and in went the arsenic and all the cattle died. That was one of the things they had to protect the farmers against. If the farmers were going to use arsenic they would be subject to all sorts of accidents. He remembered once dipping in an arsenical dip. When they had finished the cattle, he told his men to take some pigs and dip them because there were lice on them. They did so; he immediately afterwards told the men to turn the cattle out. They did as they were directed, leaving the pigs in the race. The day was warm, the pigs were thirsty, and when he returned he found all his pigs dying from arsenical poisoning. The great thing that the Society should do was to urge upon the people the necessity of getting rid of the ticks.

The Chairman said he would like to support what Mr. Douglass had said, and would like to mention an instance where spraying was effective. Mr. Rouse, Chairman of the Orange River Farmers' Association, a couple of years ago, took 120 head of cattle to a farm north of Pretoria. Shortly after his arrival there, Redwater broke out. He made a spray, and for two years, whilst the disease lasted, he kept his cattle clean, whilst the cattle all round were dying by hundreds.

Mr. Albertyn enquired if the tick which caused African Coast Fever in the Transvaal existed in the Cape Colony.

Dr. Hutcheon replied in the affirmative. He said that some time ago Mr. Lounsbury made a coloured map, showing the districts in which the ticks existed, and that had been published in the *Agricultural Journal.* He would like to say a few words in conclusion with regard to the action to be taken if the disease should come into the Colony. The experience in the Transvaal was that no farmer in an infected area should be allowed to move his cattle from his farm, and if no fresh cattle were allowed on, there was no fear of spreading the disease. If anyone was so unfortunate as to get the disease on his farm, the Government would be ready to fence the farm, but would allow no cattle to be moved, except for slaughter under strict regulations. The best thing for a man to do, if the disease broke out amongst his cattle, was to realise by slaughter, as early as possible; properly dressed carcases could be safely taken to the butcher. With respect to the affected animals, once they had recovered, there was no fear of them spreading disease.

The Chairman: Are you aware of the regulations of the Transvaal with regard to restricted areas?

Dr. Hutcheon: Yes, they have authority to carry out any regulations considered necessary. We really want something like that in force here. There was such an ordinance passed during the Rinderpest, giving the Government power to do what they thought was right. A similar ordinance was now wanted.

The Chairman asked Dr. Gunning if he could give any information of the law in force in the Transvaal with regard to fencing areas.

Dr. Gunning replied that he had not a copy of the law with him.

The Chairman said, from his experience, he believed that when the disease broke out in a certain area the farmers were compelled to fence their farms and the neighbours were compelled to bear half the cost. The Government could enclose it for them, or they could enclose it themselves at a cost not exceeding £30 per mile, which was the minimum price it could be done for. He thought it would be well that the Department of Agriculture should have the same power in case of the disease breaking out in this Colony, as that had been proved in the Transvaal to be the only means of overcoming the disease.

Mr. Crosby said that in his district the disease might come in from the Natal side, and if it did it would be apt to spread through the Redwater area.

Dr. Hutcheon said they were relying very much on the severe restrictions imposed by the Natal Government. There was no disease on the Colonial side of the Natal Border, and of course they could not legislate inside Natal. At the present time there were no restrictions on the Natal border but they previously had restrictions on the Griqualand East and Natal border, during a temporary scare, but these had been withdrawn. At the present time they were really depending on the careful regulations carried out by the Natal Government. They had the same extensive powers as the Transvaal Government; that was full power to take any precautions they considered necessary; even to the slaughter of the stock. He thought they were perfectly safe at present with Natal, as a sort of buffer between them and the area of disease. The only point in immediate danger was British Bechuanaland. The Government was very much alarmed when the disease first broke out in the Marico district, and they had a fence erected along the Border at once. At first it was thought advisable to have a double fence, but on second thoughts a single fence was considered sufficient for the present. Of course a single fence was not an absolute safeguard, but ticks did not move very far along the ground in a given direction. There was not, therefore, much fear of infection at present.

The Chairman: Supposing one farm was infected, the fact of a single fence being there would not be sufficient to keep the disease back?

Dr. Hutcheon replied that if the disease appeared on a farm in or immediately adjoining a clear area, it would be advisable to have a temporary double fence. It would also be advisable to keep the stock well away from the fence of the infected farm. He thought a resolution might be passed to the effect that the Government should have the power they desired. There was an amended Animals' Diseases Act Bill coming before the House of Assembly, unfortunately it was never reached and this opportunity could be availed of to insert a clause to that effect. The Government should also have power to immediately fence a farm or to make some arrangements by which an infected area could be fenced when the disease broke out, and the cattle should be carefully guarded in the meantime.

The Chairman said he would like to receive a resolution to that effect. He fully endorsed what Dr. Hutcheon had said; the Government should have power to deal with this disease if it broke out, and they should have extensive powers because prevention is better than cure; and if the Government had legislation the same as in the Transvaal, it would be a move in the right direction.

Mr. Evans asked Dr. Hutcheon to reply to what Mr. Douglass had said about spraying. From what Mr. Douglass had said, the spray was the poor man's friend and the dip was a thing which it was very expensive to undertake, and the system of central dips was a very dangerous one.

Dr. Hutcheon said that he did not know that it was advisable for him to enter into an argument on this matter. He wished to explain that he did not father everything that was put into the *Agricultural Journal* with regard to dipping. It was a departmental matter that he was not prepared to admit or deny. He certainly did not approve of cattle being brought to certain centres to be dipped. He was aware there was nothing that had been used that could kill ticks as fast as parraffin. He was at one with Mr. Douglass in that. However, it was a fact that some men had cleared their farms by dipping. He thought that Mr. Douglass rather exaggerated the point when he said that if they could not kill all the female ticks they could not clear the farms. The farms could be cleared if all the larva and nymphs were killed; the others would die in time; there was no doubt but that by continuous dipping they could clear the ticks. He knew men in Rhodesia who had cleared their farms by dipping. He admitted all that Mr. Douglass had said in favour of parraffin, and he was quite with him in spraying. One could get just as effective action with the spray as with the dip. He did not wish to discuss the question there because he was not prepared to make an announcement with regard to his own recommendation in this matter. The Department was responsible for what had emanated from it. He quite agreed with Mr. Douglass that there was a certain amount of danger in using arsenic.

Mr. J. E. Jones (Mafeking) said he thought it was necessary that the Agricultural Department should have some power to deal with this matter.

Mr. Krige (Stellenbosch) thought they owed considerable thanks to the Hon. Mr. Douglass for the information he had given them. He thought it was necessary that they should all know his experiences, and he thought it would be advisable if Mr. Douglass would record them.

Mr. Jones moved a resolution to the effect that the Conference advocated strong precautionary measures being taken to prevent the introduction of African Tick Fever into this Colony, and that the matter be left in the hands of the Veterinary Department.

Mr. Krige (Stellenbosch) seconded the resolution, and said that he hoped the Government would be guided by what Mr. Douglass had said.

Mr. O. E. Evans moved, as an amendment: "That whilst thanking Drs. Hutcheon and Gunning for their valuable advice regarding tick fever, this Union is of opinion that the question of the prevention of its introduction into the Colony may be left at present to the Veterinary Department, and that the Union recommend that the Agricultural Department of the Government be given wider powers to deal with fencing or other precautionary measures deemed necessary."

The Hon. A. Douglass seconded it, and said he regretted that Mr. Krige had suggested that he should give advice to the Government. He preferred to draw them along.

Mr. Krige: I mean that you should give the Department some advice.

The Hon. A. Douglass: Even with the Department I prefer to draw them along, than to drag them. Men living on farms could follow matters like this up far better than it could be done in the scientific department. I am a great admirer of the scientific department. I think no Government has a better or more faithful servant than this Government has in Mr. Lounsbury, and a better servant than he was never in the service of the Cape Government; in fact, in Mr. Lounsbury and the Chief (Dr. Hutcheon) they had two men thoroughly at heart with the work.

Mr. Jones at this stage withdrew his motion.

Mr. Evans's motion was carried unanimously.

EXTRA TROPICAL FORESTRY.

Being Notes on Timber and other Trees cultivated in South Africa and in the Extra-Tropical Forests of other Countries.

BY D. E. HUTCHINS, F. R. Met. Soc., Conservator of Forests,
Cape Town.

(Continued from page 772 *of Volume XXVI.)*

MR. S. MARKS'S PLANTATIONS AT VEREENIGING.

The total area of the estate is 125,000 acres of which about 1,800 acres were planted at my visit in 1903. The cost up to 1903 was £30,000, or rather under £17 an acre. A portion of the area was turned over with a steam plough which I saw in operation. Though the conditions here were favourable to the steam plough and the out-turn of work per acre good, the cost of working was high. I understood that the nett result of the steam plough work was not altogether favourable.

The situation is on the banks of the Vaal River. The soil generally is fairly open, low-lying, moist and deep, thus compensating to a considerable extent for the deficient rainfall, which averages only 25 inches, while as much as much as 22 degrees of frost have been registered during recent years. It would probably be correct to say there are 25 inches of rain and 25 degrees of maximum frost at Vereeniging! The three chief trees planted are Oak, (*Quercus pedunculata*) Cluster-pine and Insignis pine. The number of trees in the plantation at the time of my visit was about a million each of Pine and Oak. During the recent dry years the Insignis pine has suffered more from drought than the Cluster-pine. It is probable that the Insignis pine in this climate will have but a short life. The Cluster-pine so far looks well, though they have not quite the appearance of those nearer the coast and in a winter rainfall. The Oaks show a growth which, up to the present, seems all that could be desired, with good straight stems, and some of them at six years old 30 feet in height. They have been suffering lately from the attacks of an Aphis (which has been determined as a species of Phylloxera) but it is too soon yet to say if this is going to injure them permanently.

There are also smaller plantations of Ash and Alder, and a block of 10,000 Sycamore (*Acer negundo*). On the whole, this Sycamore plot shewed a good growth, but there were ominous signs of failure in the drier part. Few Eucalypts have been planted, and of these the only really successful tree was *E. polyanthemos* or Den. On the whole Mr. Marks's plantation must be considered to be a most successful undertaking and to reflect the greatest credit on its originator. The Oaks if they do not afford timber of value will probably repay their cost in acorns and pork. I trust that these plantations will be extended by their enterprising originator whose Forestry stands almost at the head of any similar work done by the mining magnates. It will be easy, as the climatically unsuitable trees at Vereeniging die off, to replace them by Mexican and Western Himalayan trees; and thus to constitute a noble tract of woodland in this treeless veld.

For further particulars regarding them and other plantations in Orangia a recent report by Mr. J. S. Lister (Bloemfontein 1903) may be consulted. A forest Department has recently been established and young trees and tree seeds are obtainable from it at moderate rates.

BECHUANALAND.

Situated beyond the regular South-east rains that water the Transvaal, the climate of Bechuanaland is extremely uncertain. Two trees grow there naturally, the common Mimosa (*Acacia horrida*) and the so-called Kameeldoorn (*Acacia giraffæ*), the latter the better tree of the two. But its slow growth and excessively hard wood seem to place it outside any scheme of timber plantations. Since the breaking down of the political barriers between Bechuanaland and the better watered Transvaal there is less reason to spend money on doubtfully successful timber plantations in Bechuanaland. There remains, however, the necessity of a certain number of trees for shade in towns for shelter on farms and for beauty everywhere. Tree-planting may render parts of Bechuanaland park-like. The country is too dry to produce dense high timber forest.

At Vryburg there has been much zealous tree-planting, but the trees are too young and too few to afford much indication of what exotic timber trees are really suited to the country. A small experimental plantation seems particularly desirable here, to shew the way for larger work or to prove that Bechuanaland is outside the rainfall zone of profitable tree-planting. Hardly any of the trees most suited to the climate have yet been planted.

In 1898 I noticed the following Eucalypts growing well—*E. rostrata, E. tereticornis, E. gunnii, E. globulus* and *E. viminalis*. Of trees of the Cedar class Deodar showed a very good growth and *Cupressus lusitanica, C. macrocarpa* and *C. sempervirens* were also good. I looked for, but saw no specimens of *Juniperus virginiana*.

Pines.—I saw stunted worthless specimens of *Pinus pinea*. *P. halepensis* has been planted a good deal, but its appearance makes me think it not worth planting. It is bushy, light in the foliage and the group of 7 year old trees on the market place do not average more than 7 ft. high, but at Kenilworth, Kimberley, it looks better and has survived drought that has killed *Casuarina leptoclada* alongside. *Pinus insignis* dies in 4 or 5 years.

Other trees.—Pepper tree, (*Schinus molle*) grows vigorously, is largely planted and a great favourite. *Casuarina leptoclada* is the most vigorous growing tree there after the Eucalypts.

All the trees were, or had been, partially irrigated; but most of them were without water at the time of my visit on account of the prolonged drought which then prevailed.

(7) KNYSNA AND SOUTHERN COAST DISTRICTS.

With an abundant rain-fall throughout the year not less than 25 *inches, and probably reaching* 60 *inches on the mountains and at the head of the mountain passes.*

Here we have a forcing climate with rain at intervals throughout the year, and (mostly as a consequence of this fertile climate) very barren soils. The geological formation is generally sandstone. A peculiar feature of the climate is the violent hot wind of winter known as the "Berg" wind, because it blows from the north down the berg or mountain chain which bounds the Knysna district in the north as does the sea on the south.

Here may be grown every extra-tropical tree except those of dry countries. The latter as a rule require better soils than those found at Knysna and on very wet mountain tops. In such climates the usual poverty of soil and rank indigenous growth are great obstacles to tree-planting. To meet these difficulties it is best to select trees that will prosper on poor soil and which by their rapid growth will soon dominate the rank indigenous vegetation. Such trees are Cluster-pine, Black Wattle, Blackwood and most trees of the east Australian coast above Sydney.

Within the indigenous forest, or where the forest has been lately cleared or burnt, the soils are rich; but the tree-planter has to fight a terribly rank vegetation as soon as the disappearance of the forest covert admits light to the soil. The cleaning and weeding in such rich forest land has sometimes cost up to £20 an acre which is of course a prohibitive figure for forest planting. The Forester who wishes to replace the low-grade indigenous species by the more valuable timbers of larger forest floras has a difficult task. He is almost limited to:—

(1) Shade-bearing trees such as Camphor, *Cedrela australis*, and to a less extent Blackwood which can be planted under covert.

(2) Vigorous-growing leaf-shedders which can be planted as large trees in winter and so have their heads always above the rank ground herbage.

Of the actual trees that may be grown with success at Knysna and the southern coast districts it is more easy to say what extra-tropical trees will not grow than to attempt to enumerate those that will. Generally speaking, all the trees enumerated in Zone No. 1 (the Cape Peninsula and South-west) will flourish at Knysna, some of these trees growing better and some worse in the all-the-year-

Stinkwood *Ocotea bullata*

Elæodendron croceum Safraan

round rainfall of the Southern coast. Thus Black Wattle (*Acacia decurrens*) grows better, *Acacia pycnantha* not quite so well in accordance with their natural habitats in Australia. Kari (*Eucalyptus diversicolor*) grows equally well, when it might be expected to grow less well from its climatic habitat, but of course these and other observations refer to still young trees. Kari though it grows so well now at Knysna may fail later and it seems unwise to plant it when there are so many trees better-timbered and also better suited climatically. The common Oak (*Quercus pedunculata*) grows well at George, Swellendam, Groot-Brak and other places. The warmer drier winters and the berg winds tend to render the fall of the leaf shorter than in the Cape Peninsula. In the opinion of Mr. C. B. McNaughton, Conservator of Forests, Knysna, Oaks tend to develop drooping branches, and under the hot berg winds of winter are often nearly evergreen in Knysna. Of three large old fine Oaks at Grootvadersbosch, one has the weeping habit very markedly.

Among the pines that have been tried, Cluster-pine on grass land grows perhaps with even greater vigour than in the Cape Peninsula and South-west, though on old forest land it is sometimes difficult to establish. At Concordia near Knysna on very sour grass lands is a large and successful Government plantation of Cluster-pine. *Pinus canariensis* seems so far to do as well as in the South-west, but has not been much planted. *Pinus australis*, as far as can be judged, does better than in the South-west, but *P. halepensis* worse. *Pinus taeda* and *P. mitis* are doing well at Grootvadersbosch, *Pinus thunbergii* particularly well. Camphor grows well, both under half shade in the forest and in the open, but it is only in one locality —Grootvadersbosch—that it has been tried to any extent. Blackwood, both in forest glades and in the open, shoots up with the utmost vigour, profiting evidently by its release from the dry summer of the South-west. *Tristania syncarpia* shows a most marked improved growth. Of the Gums, Kari (*Eucalyptus diversicolor*) has been extensively planted, in the Concordia plantation near Knysna village. It is there used chiefly for fire-line planting in the Cluster-pine plantations. It is one of the fastest growing Eucalypts at Grootvadersbosch. Jarrah (*Eucalyptus marginata*) failed at Concordia, but seems to do better at Grootvadersbosch. *Eucalyptus pilularis* flourishes as in the South-west, but seems sensitive to poverty of soil in the sourveld. Of all the Eucalypts planted at Grootvadersbosch the most remarkable growth on the sourveld is that of *Eucalyptus maculata*. This tree requiring summer rainfall is practically a failure in all the more western plantations. Other Gums that grow well are :—

Eucalyptus microcorys.
„ *resinifera.*
„ *globulus.*
„ *saligna.*
„ *paniculata.*
„ *botryoides.*
„ *acmenoides.*

Sugar gum (*Eucalyptus corynocalyx*) is growing well so far, but may fail later.

Of the Cypresses *Cupressus macrocarpa* is so far quite vigorous, but perhaps *Cupressus lusitanica* may prove more lasting. *Cupressus sempervirens* grows with more vigour than in the South-west. Other Cypresses have been planted, but it is too early to speak positively regarding their growth, while *Sequoia sempervirens* is just coming under trial.

In the 1901 tree-planting competition, a first prize of £130 was awarded to W. J. A. Beckett of Diep Kloof, George. This was on the coast plateau at an elevation of about 800 feet. This plantation is Black Wattle, with a little *Acacia pycnantha*, the latter being reported by the judges as doing remarkably well. Here it was found that the old cultivated lands produced results inferior to newly broken up veld. The annual rainfall here is estimated at 35 inches. At 4 years of age the Black Wattle averaged 20 feet in height and 2½ inches in diameter.

Black Wattle has also done well in a small plantation made by Archdeacon Fogg near George and at various spots where it has been planted by the Forest Department between Swellendam and Storms River. There seems no reason why this productive tree should not be grown in this area as it has been grown in Natal, where they get about £100,000 a year from it. The yield of bark might be slightly less but of slightly higher quality. If the cultivation became general it would be of incalculable benefit to so poor a district. Government should plant or sow it largely in burnt forest areas. It is in itself an efficient firebreak.

The strip of heavy rainfall country, skirting the coast range of mountains from Storms River to Swellendam, though agriculturally poor, is forestally the richest in South Africa. Here can be grown the best trees from some of the finest forests in the world. Here could be produced many times over that one and a half million pounds worth of timber now imported yearly to South Africa. Here could be reproduced the glories of the forests of Japan, of Southern Brazil, and of the Southern United States of America. Here only in South Africa do we get an all-the-year-round rainfall. The sky is rarely for long without a cloud. The hungry empty South African sky is unknown here. And even the hot bergwind does little harm to the forests, though so trying to man and beast, when in the middle of a fresh winter's day it sweeps down from the mountains, hot, dry and unwholesome, like the Mistral of Provence. One can only deplore the policy which has left undeveloped the forest potentiality of so rich a forest country; a country where forestry is easy and agriculture difficult, and where the people of the country prosper or starve according to the condition of the forest.

(8) EASTERN COAST AND TRANSKEIAN COAST DISTRICTS

15 ins. to 40 ins. summer rainfall, little or no frost, Humansdorp to Port St. John's.

At Uitenhage irrigation is necessary, but going northeastward the rainfall rapidly improves and as soon as fertile limits are reached near East London, there is a great variety of trees to choose from It would make too long a list to specify them. We have firstly all the trees from the largest forest region in Australia, the Eastern coast forest belt north of Sydney, N. S. Wales. Of those the Red cedar *Cedrela australis* is the most valuable, while the White Cedar *Melia composita* and *Grevillea robusta* yield useful soft woods. Among hardwoods are many Eucalypts of great value, such as Tallow-wood, the Jarrah substitute *E. resinifera*, the Iron-barks, the quick-growing Pillularis Gum, and the straight clean Maculata Gum. *Callitris columellaris* is the Cypress-pine best suited to this region, but

Olea laurifolia—Black Ironwood

Callitris robusta and *Callitris calcarata* should also be tried. Many of the Japanese, South American and Mediterranean trees flourish in this region. The trees usually seen are those mentioned under No. 1.

In the 1901 tree-planting competition a first prize of £150 was awarded to J. Leighton of Berlin, near East London, for 60 acres spaced 5 feet by 5 feet, the principal species being Eucalypts, Pines, Cypresses and Beefwoods.

Prof. Maiden in one of his forest tours made the following observation on the frost-bearing power of certain Australian trees growing naturally in this zone:—

Frost-bearing trees in the Northern coast forests of New South Wales.

> About Gloucester, lat. 33, the effects of the comparatively severe frosts were very plainly evident The Stinging-trees and Bastard-rosewoods (*Synoum*), in the bits of brush, were cut down to the ground; and amongst the Eucalypts the Forest-box *E. hemiphloia* was badly bitten. The Forest-red-gum (*E tereticornis*), the Apple, *Angophora*, Iron-bark, etc., stood the frost with apparent indifference.
>
> (J. H. Maiden, *Agri. Gaz*, N.S.W., Sept., 1895)

(9) MID-ELEVATION EASTERN DISTRICTS AND TRANSKEI,

Grahamstown to Kokstad 20 *ins. to* 40 *ins. rainfall, rising to double these limits along the wooded Amatolas.*

Here on the southern slopes of many of the mountain Ranges are heavy rainfalls and at the different elevations varying climates. Here may be grown all the trees of the warm temperate zone with the exception of a few which do not flourish except with winter rains and dry summers. It must be remembered that while nearly all the trees of the warm temperate zone may be grown in this region it is quite safe to plant only those from countries such as Eastern Australia and the Argentine where the rainfall is a similar one and where periods of extreme drought occur at uncertain intervals. The trees usually planted are those specified under No. (1) many of them not the best suited to the region.

The better watered regions of the zone along the Amatola mountains have the most favourable climate for European and American leaf-shedding trees. The winter is fairly severe and has a little rain. In Spring when the leaf-shedding trees start into growth, sufficient rain falls to be depended upon for Spring growth and trees escape being stunted with drought as happens so often elsewhere in the less favoured districts of South Africa. Then comes the abundant summer rainfall with a warm sun and the most vigorous unchecked growth. I have nowhere in South Africa seen young Oaks and other leaf-shedding trees equal to those at Fort Cunnyngham and Evelyn Valley. The frost at Fort Cunnyngham is mild, not more than 10° at its worst in the valleys. This sometimes touches the early leaves of the Oaks, Ashes and other leaf-shedders but does them no serious harm.

Towards Kokstad the climate becomes more severe in winter and wetter in summer. Occasionally the winters are as severe as those of the Drakensberg, and then the indigenous evergreen forest with its semi-tropical affinities suffers. In June 1902, rivers were frozen over and there were snow drifts of great depth. The District Forest Officer at Kokstad described the damage done to some of the indigenous forest as almost beyond description: there was hardly a single tree in some of the forests that was not damaged by the snow, and the most sheltered forest got a greater weight of snow on the branches and suffered more. Here the branches were all broken off leaving only bare stumps. Snow drifts of enormous depth accumulated and there was great loss amongst farmers' livestock.

In this area flourish all the valuable Eucalypts except those that are particularly tender to frost and the purely winter-rainfall Gums such as Jarrah. Of the good-timbered Gums that have been grown with success *Eucalyptus saligna* and *E. tereticornis* are particularly worthy of mention. *E. pilularis* is tender to frost and *E. paniculata* does not seem to have been much tried. *Eucalyptus sideroxylon* succeeds and seems to grow faster than in the south-west. It is unfortunate that the more valuable Iron-bark *Euc. paniculata* has not been more extensively tried and the free-growing *E. resinifera* particularly *Euc. resinifera var. grandiflora.* The very vigorous growth of Blue-gum invites a cultivation more extended than is warranted by the value of its timber. Blackwood (*Acacia melanoxylon*) and Black Wattle (*Acacia decurrens*) are at their best. Special Black Wattle plantations are being formed by the Forest Department for the purposes of supplying the Kaffirs with wattles for their huts, and thus saving the precious saplings in the under-stocked indigenous forest.

Of Cypresses *Cupressus macrocarpa* fails, as would be expected, after some years. *Cupressus lusitanica* is one of the best Cypresses for this region; other Cypresses and, indeed, the great bulk of the timber trees suited to the region, remain still to be tried.

In the 1901 tree-planting competition, the third prize (£200) was awarded to the Trappists, Mariazell, Ongeluk Nek. The area of this plantation at that time was 34½ acres, containing 101,000 trees, the principal species grown being Robinia, Poplar, Catalpa, Eucalypts, Pines, Cypresses and Black Wattle. Mr. J. S. Lister visited this plantation again in 1903 and speaks highly of the fine growth of the trees there.

(10) EASTERN HIGHLANDS, STORMBERG TO BASUTOLAND.

20 ins. to 40 ins. rainfall, falling in summer: cool summers moderately warm at intervals, very cold winters with severe black frost, but little snow.

The trees suitable for this area are mainly those which are enumerated later for the Transvaal, with this difference, that in this area there is a little winter rain, whereas in the Transvaal there is practically none. The two chief foreign countries from which trees should be drawn for the Transvaal are the drier western Himalayas and Mexico. Of these two the Himalayan area is to be preferred for the eastern highland area of Cape Colony, since there is a secondary winter rainfall in the Himalayas of some importance, while there is practically no winter rain in the Transvaal or in Mexico. Those readers who, in the Transvaal list quoted below, may be uncertain which trees may have come from Mexico and which from the Himalayas, will find the country of origin given in my Transvaal Forest Report (Agricultural Department, Pretoria 1903).

The bleak climate of the eastern highlands suggests a Conifer country, yet few Conifers of the right sort have been planted. In Mexico there are about 30 different species of Pines alone, and though some of these species may prove on further investigation to be varieties, they are probably all worthy of trial in the highlands of the Transkei. In this brusque climate the Chinese *Pinus bungeana* seems particularly worthy of trial, also the Chinese *P. manchurica* and *P. massoniana.* The Pines and Junipers of the mountains of northern Texas should also be tried here, and for the colder, higher elevations, the Conifers of the mountains to the northwards, as far as Utah. See the list of drought-resistant and hardy trees given under *No.* 6, *Upper Karoo and Orangia.* At lower elevations the hardiest of the Australian Callitrises may be tried viz., *Callitris robusta.*

At Molteno on the Stormberg, Mr. T. R. Sim reported 3 year old trees of Plane, Ash and Oak to be all healthy, but untimely frost damaged the young growth. The only large trees I have seen flourishing in this bleak country were the common Weeping Willow (*Salix babylonica*) and the common white Poplar (*Populus alba*). At Dordrecht, 5,500 ft. elevation 27 inches rainfall, besides the above trees may be seen good-sized specimens of *Eucalyptus viminalis.* Mr. Sim (now Conservator of Forests, Natal), cites the following as likely to succeed at Molteno, 5,300 feet, summer rains about 26 inches, frost and snow in winter: high, almost constant, N.W. winds:

Pinus sylvestris
   ,, *laricio,*
   ,, *rigida*
Cedrus deodara
   ,, *libani*
Larix europea (succeeds at Halse's)
Acacia melanoxylon

Eucalypts if sheltered:

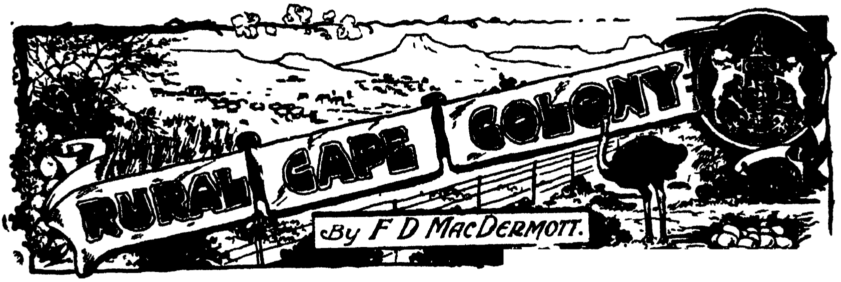
Eucalyptus viminalis
   ,, *rostrata*
   ,, *tereticornis*
   ,, *gunii*
   ,, *amygdalina*
   ,, *melliodora*

Mr. J. B. Leach's plantation at Harrison, Whittlesea, at the tree-planting competition of 1901, was awarded the second prize (£300). It was 31¼ acres in extent and contained 144,000 trees, mostly Poplar. The Poplar plantations were Lombardy Poplar and Cottonwood. Mr. Leach had planted Poplar in order to meet the demand for fruit and butter boxes and match-wood, the thinnings and poles to be used for hut wattles and general farm purposes.

In the same tree-planting competition the first prize of £500 was awarded to Mr. G. Vice's plantation at Molteno, of which the total area entered for competition was 54 acres, containing 106,000 trees, the principal species being *Pinus insignis* and *P. pinaster*, with a belt of Lombardy Poplar and *Pinus halepensis*. In passing the locality a few years ago, I was struck with the fine growth in this plantation.

Messrs. Halse Bros. of Carnarvon farm, on the Indwe line, have made very extensive plantation These were intended for the tree-planting competition, but suffered so severely from hailstorm and other disasters that they were withdrawn from the competition and thus neither visited nor described by the judges. And similarly when I visited the locality a few years ago, Mr. Halse was absent. The trees planted were unfortunately not well suited climatically so that the results were disappointing. The large area under *Eucalyptus globulus* suffered much from Aphis, and other unsuitable trees from frost and drought.

The Hon. W. Rogers, M.L.C., at his home on the Bontebok Flats, Cathcart Division, is able to show a remarkably fine growth in the trees planted near his homestead. At my visit *Pinus pinaster* and *P. insignis* presented a nearly equally vigorous growth. Mr. Rogers tells me that now at 17 years Insignis pines are 90 feet in height. Stone-pine seems to do as well there as in the West of the Colony before the advent of the Stone-pine disease. *Cupressus macrocarpa* also does well at Glencairn. The recent four years' drought has not appreciably affected the growth of any of the Glencairn trees.



NO. XIV.

IN THE DISTRICT OF WORCESTER.

THE CAPE ORCHARD COMPANY.

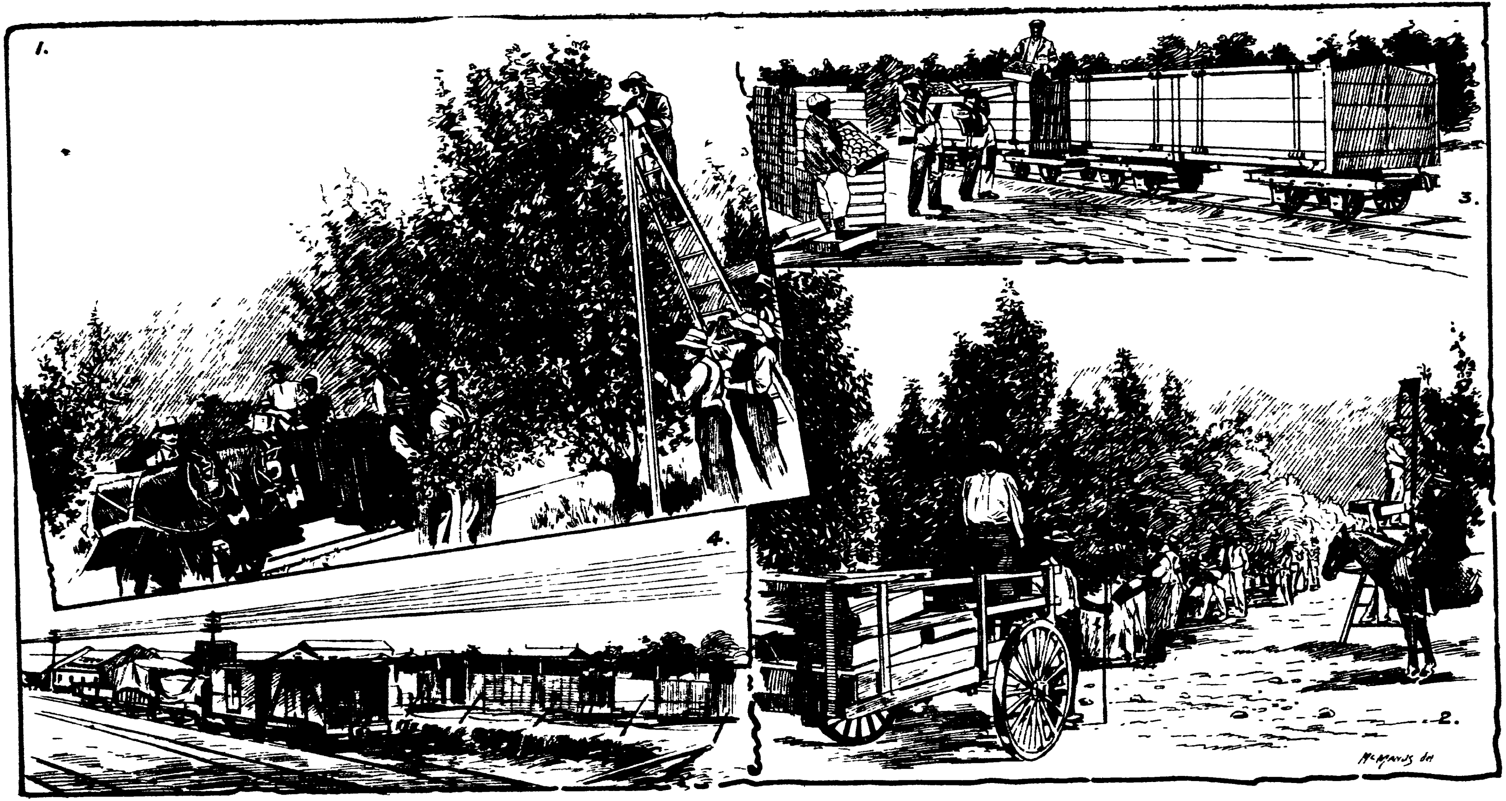
The district of Worcester is largely given up to stock and arable farming, but some of its most striking cultural features also include viticulture and fruit. Of the latter the most important—in fact, one of the most important in this country—and probably the largest individual orcharding concern in the Colony, is located in this district. The Cape Orchard Company is too well known both here and in Europe by its mercantile mark "C.O.C." to necessitate attention being called to the fact that it commands many markets, and has a widespread reputation for the quality of its products. But in dealing with the cultural features of the Colony it is impossible to pass it by without a full description of the excellent methods by which it has gained its commercial standing.

Passengers by the day trains that proceed Northwards from Cape Town are always interested in the Hex River Valley. After leaving Worcester the railway winds into a series of narrow gorges, through which the Hex River runs, and after awhile these gorges widen out until the famous Hex River Valley opens up on either side. The scenery is magnificent, for on the one hand stands the mighty Matroosberg, the giant peak of the Hex River Range, on the other run the Gwadouwsbergen, and in the forefront lies the Hex River Pass, over which the railway winds its tortuous way until it reaches the higher levels of the Karroo proper. Nestling in the valley, about half-way, lies the small station of Hex River, flanked on either side by vineyards, and every sign of comfort and prosperity; a few miles further on and the train passes another small station, designated Orchard Siding, and here are to be seen active signs of life and energy quite unexpected in such a picturesque spot. It is here that the extensive operations of the Cape Orchard Company are carried on, and the passenger who alighted there in the height of the harvesting season and had sufficient curiosity to take a look around would be surprised at the busy scene that would open before his eyes. The natural conditions of the surrounding country indicate to the observant eye the character of the soil, and the most likely methods of cultivation that would be suitable for work on a large scale in this valley, but there are several incidentals which have to be taken into consideration before satisfactory conclusions could be drawn. The surrounding mountains give an ample water supply, but the regular rainfall is not great, amounting to an average of very little over 14 inches per annum. The soil of the valley is mostly river silt washed down in the course of the ages, and it is very loose and friable, as it contains a goodly proportion of sand. Another feature, which amounts almost to a drawback, is the presence of clays not very far from the surface in many parts, but, taken on the whole, the soil may be said to be fairly deep and, being loose, is not difficult to work.

THE ESTATE.

The estate, as it appears at present, is very different from what it was when the Cape Orchard Company took it over. The farm was bought in 1893, when Mr. P. R. Malleson (one of the joint Managing Directors, the other being Mr. Dicey) proceeded with the work of laying it out for fruit. This was no easy task, for at that time the river had cut erratic courses for itself, and by changing its channels had turned a great part of the best and most suitable land into sandy marshes. These necessitated a good deal of drainage work, and these drains have since had to be extended as the work of cultivation proceeded, until at the present day the drains form one of the most important features of the property, and reflect the highest credit on the foresight of the management.

The extent of the property is about 3,000 acres, and of this some 2,000 acres at least are irrigable; the property can be extended, however, so as to bring more irrigable land within the influence of the company's operations. The actual acreage under fruit trees now amounts to between four and five hundred. The planting began in 1894, when about 400 trees were put in, all of which were procured in South Africa. At that time, it has to be remembered, it was very difficult to get a large supply of fruit trees of the right varieties for planting in this country, for it was not till after this that Messrs. Pickstone started their large nurseries. As a consequence, some of the earlier trees had to be procured from Europe, and with the addition of these importations something like a thousand trees were put in shortly afterwards. Planting may be said to have started in earnest about 1895, when nearly 10,000 trees were established, and after that, planting continued at the rate of about 5,000 per annum, until the orchards now contain between 60,000 and 70,000 trees of all sorts. Of course some are still young and have not come into bearing, but the great majority are now yielding a return, though not giving the full crops that are expected. This particularly applies to the apples and pears, though the crops of fruit from these orchards this year were very large and of excellent quality, as the reports from London have shewn during the season just closed.



THE CAPE ORCHARD CO.

1. Harvesting with train trucks. 2. Harvesters at work and orchard wagon. 3. Loading bogey trucks with boxes of fruit.
4. View of buildings and Railway Siding

IRRIGATION

Although the orchards depend largely on irrigation, no elaborate works are necessitated in this direction. The Hex River runs all through the property, but is not used to any extent for irrigation purposes. There are other and better sources of water supply on the property, and these are availed of to the fullest extent. The kloofs and ravines which score the mountain ranges on either side of the valley bring down large quantities of water which serve the purposes of the company much better than the river water would. Two of these streams supply all the needs of the whole property, not only for irrigation purposes, but also provide power, for here we have not only orcharding on a commercial scale, but by the utilisation of the water power available, a very important and interesting mechanical installation is at work which includes a large cold store for holding the fruit during the seasons when the markets are glutted. But I will deal with that later on. The subsoil drainage is good, so that irrigation in moderation can be carried out without any fear as to the results. But without irrigation it is doubtful if it would be possible to grow trees owing to the large volumes of water that lie in the soil during certain seasons of the year. The rainfall is not very heavy, but the river, when swollen by the mountain torrents after heavy rains and snow on the uplands, brings a great deal of water into the valley which percolates into all the lower-lying lands. This is apt to give trouble if not carefully watched. But the system of irrigation tends to minimise any possibility of trouble that may arise from this source, for by this means the trees are not encouraged to root deep, but to seek sustenance near the surface. The drainage scheme too may be said to form, in reality, part of the irrigation plan, for by its means it became possible to use what were in reality old swamps, intersected by islands, and turn them into smiling, fruitful orchards

PIONEER TROUBLES.

The above short description of some of the natural difficulties which have been overcome by the management of this enterprising concern, which may fairly be described as the pioneer of the commercial fruit industry of the Western Province, will serve to show that fruit-farming in this Colony is not quite such an easy task as some would imagine. As a matter of fact the orchardist if he wishes to succeed, must be always at work, always on the alert, and can never look forward to a resting period of any length. But that is beside the object of this article. There were many other troubles which the pioneers of this industry have had to face, including some which have still to be overcome, but among the most trying of these was the great difficulty experienced at first in getting suitable varieties of trees, and, when they were obtained, the further expense and anxiety of testing them to see if the local conditions would suit them or not. No one, but those most intimately connected with the pioneer work of the orchardists here can form any conception of the numbers of trees which have had to be "worked over," or replaced by other varieties. And of this trying experience the Cape Orchard Co. has had its fair share, though its troubles in this direction have not been quite so serious as they might have been. In a new industry these problems have always to be faced, and the beginner who expects to be able to completely avoid them is bound to meet with a very complete disillusion before he is finished. The great thing to do is follow the best models available and try to avoid mistakes, but when the mistakes are discovered, profit by them as far as possible. This seems to have been the guiding principle of this company and the result is distinctly favourable, for the enterprise is now entering upon the profit-earning phase of its career.

Another pecularity of the local conditions which at one time caused no little anxiety was the fact that too much cultivation in the orchards was found to be far from advantageous. The soil being loose and apt to get looser with the removal of the natural growths, it has been found to be better to leave the weeds and grasses more severely alone than is usually considered advisable in similar circumstances elsewhere. When the natural growths are removed by cultivation, and the ground left bare for the summer, the heat of the soil becomes so great as to retard development and injure the trees. The orchards as a consequence do not always present that appearance of perfect cultivation which is the delight of the clean farmer. The necessity is regretted, but it remains, for otherwise an expensive system of mulching would have to be resorted to. The natural growths left on the soil neutralise to a certain extent the summer heats which would otherwise be most inimical to the trees, and this has been proved by the fact that where the growth has been left on the ground during the summer many of the trees have made marvellous growth.

THE MAIN CROPS

of these orchards are apples and pears, of which most of the leading varieties are now planted and bearing or coming into bearing. These do remarkably well, and a great future is predicted for them. Peaches and plums are also a large crop, and have thrived with vigour, but apricots have not been found to do so well. The apricot country is further west. European plums have been tried on a fairly extensive scale, and one variety, the Dunestre, has been very successful. Prunes are also a very sound crop here, with the one drawback, that they attract the attention of the red spider (Bryobia mite). These pests check the trees very seriously, and in time may prove a pest of some dimensions. The dried prunes from this estate are spoken of as being amongst the best in the market. A few figures gathered during my visit to this property will do more to shew what has actually been accomplished by the company than anything else. I append, therefore, the following returns, shewing the output of the orchards for the seasons 1903 and 1904 :—

CAPE ORCHARD COMPANY

Interior of Machinery House showing Refrigerating Plant, &c., at work

Portion of the interior of the Packing Shed. Cape Orchard Co.

	Season 1903. lbs.	Season 1904. lbs.
Apricots	16,083	14,077
Peaches	109,025	198,560
Nectarines	35,349	48,354
Prunes	68,489	91,391
Plums	165,811	211,972
Pears	42,656	194,246
Apples	46,366	166,007

The exact returns for the 1905 season were not made up when I obtained the material for this article; but in spite of the bad season, the late peaches, plums, pears, &c., were estimated to bring the average well up to that of previous seasons.

MODERN METHODS AT WORK.

In the earlier part of this article I alluded to the busy scene that meets the eye in the harvesting season in these extensive orchards and the installation of machinery which has become such an important feature in the activities of this company. To deal with the mechanical installation first it is necessary to revert to the natural water supply of the valley. One of the kloofs which brings down one of the many streams that go to make the volume of the everflowing Hex River, contains such an excellent supply that it has been harnessed in to provide all the power needed on the estate, with the exception of haulage. The central packing house, which is a large building—view herewith showing only a portion of the interior—is the centre of all activity. Alongside this is situated the box-making sheds, and behind are the graders and drying grounds. In the same group of buildings a large cold store has been erected, and the whole of the machinery for the cold storage, a jamming and tin-making plant, box-nailing machines, and an electric lighting installation that extends over the greater part of the estate, are driven by the power generated from this one stream. The electric light itself is a great advantage, beside being a comfort amounting almost to a luxury for domestic purposes. In the packing season the volume of stuff to be handled is so large that the packery has to be kept going late into the night in order to cope with the enormous amount of work which has to be done. With a good system of electric lighting this is possible, and the labour does not become too trying. Without it there would be great delays and consequent losses. The cold storage installation, too, is a great advantage, as it enables the company to hold back its stocks when the markets are glutted with the produce of other orchards, and so ensure itself against loss. All these things, however, cost money, and they are only possible to those who can command capital. Fortunately, the Cape Orchard Company seems to have had the command of sufficient capital to put everything on a proper footing, and the result speaks for itself.

Water Power and Electricity.

The water power is harnessed in at a point in the Kloof itself about a mile and a half from the packery. The piping leads down the Kloof from well up the side of the mountain, there being some 3,400 feet of it to bring the water to the huge Pelton wheel. The gauge of the piping is 12 in. at the top, that is reduced to 10 in. lower down, and this huge volume of water with a head of 454 feet behind it is compressed into a 1⅜ in. delivery pipe at the wheel. This gives a maximun horse-power of 102, but for the present purposes only 60 are made available. The Pelton wheel drives an electric dynamo which generates the current that is distributed from there all over the estate. The 60-h.p. of the dynamo becomes considerably reduced by the time it reaches the packery and cold storage, the actual working power being about 50-h.p. The distribution is all carried on overhead wires.

The Freezing Plant

consists of two refrigerating machines, one a 12½ ton Hercules, equal to 40,000 cubic feet of storage, and the other a 6 ton Linde machine, equal to 20,000 cubic feet. These are driven from electric motors supplied by current from the dynamo in the Kloof. The Linde was the first machine erected, being installed the year before last, but it was soon realised that its capacity would be insufficient for the storage that would ultimately be needed, so the Hercules was put in. The cold chambers comprise the full 60,000 cubic feet, and at the time of my visit were full. Fans for circulating the air in the cool chambers are also worked by the electric power available. In addition to the above the company is getting ready for

Further Activities,

for a complete installation for jam-making and tinning has been placed on order, and is rapidly being completed, so that before long we should be hearing of this new departure in its commercial form. This plant includes electric boilers—an innovation for this country, for there are few places where electricity can be generated so cheaply as to allow of its economical use as a heater. The advantages of the electrical system are very great as compared with ordinary methods and they should enable the company to enter the market with every hope of success.

Economic Harvesting.

The other most interesting feature of this enterprising concern and one that calls for particular attention is the economic manner in which a great deal of the farm work is done and the whole of the harvesting accomplished. In the views and sketches herewith it will be noticed that the haulage of the fruit from the orchard to the packhouse is accomplished by means of mule trams. For this purpose several miles of narrow-gauge tram-lines run through the estate, well laid and carefully graded so that a couple of mules can haul a load of fruit that would tax the energies of big teams in ordinary conditions. The large bogey trucks run quite easily, even when loaded to their full capacity, and it is quite a sight to see a small team of mules trotting away with a train of two or three of these trucks with but little apparent effort. The rails are laid in central positions through the orchards and the trucks are loaded up from the ordinary Californian fruit wagon, now fairly well known to Western Province orchardists, as they have been in use for some time on the Rhodes Fruit Farms. These single mule wagons are taken into the orchards, loaded with the fruit in boxes, as shewn in the illustrations herewith, and when full are taken to a central position on the tram line where the boxes are loaded direct into the tram trucks, if one is available, if not, the boxes are piled up alongside the track; the tram comes along and takes them off to the packery. By this means a great deal of the unnecessary handling of the fruit, and the risks attendant on that process, are avoided. Enormous quantities of stuff can be hauled away by this system, and perfect control kept of the supply as it can be forwarded as it is needed for handling in the packery.

The electrical plant was installed by Messrs. Siemens Bros., Ltd., a part of the erection was carried out by Messrs. G. Findlay & Co., and a part by Messrs. Siemens. The tramway system, trucks, rails, etc., were supplied by the well-known firm of Arthur Koppel, and great credit is due to each of these houses for the excellent manner in which the work has been carried out.

A New Departure.

As the Orchard Company has still a good deal of land which is not cultivated by themselves at present, a new departure has been recently made of letting out small lots to tenant farmers. The scheme adopted, and found to answer fairly well so far, is that the company allots each tenant a certain acreage of ground, builds a comfortable brick cottage for him, and lets him have the use of the holding the first year free. The second year a small rent is charged, and this is gradually increased year by year until the fifth year, when the permanent rent is fixed on a percentage of the valuation to be decided upon. The only condition the company insists upon is that permanent crops shall be established as opportunity offers—the earlier tenants having gone in for vines principally—but intermediate crops may be taken off as required until the permanent crops are bearing. All the land so let off is irrigable, and, I understand, in case any of the land so leased proves unsuitable, or is found to be unfavourable to irrigation, other suitable land is to be provided. This scheme should provide energetic young men, with a taste for agriculture, with an opportunity for beginning work upon a small capital. There are at the present time some eight tenants on the property, who all seem to be fairly comfortable and satisfied.

EXPERIMENTS WITH MEALIES AS A FORAGE CROP.

A COMPARISON OF VARIETIES.

By Dr. E. A. Nobbs, Agricultural Assistant.

Mealies are generally regarded in Cape Colony as a crop of the Eastern Province, and our South Coast. It is on account of the dry summer season that comparatively little is grown in the South West. The dry period from December onwards to March, is in these latter districts the time of scarcity on the veld, especially of succulent green crops. The cultivation of green forage crops, especially where dairying is carried on, is steadily gaining ground, and along with barley, tares and rape, mealies are largely grown as fresh feed for milch cows.

When sowing the crop at the Government farm, Elsenburg, last season, it was suggested that instead of sowing only one kind, a number of varieties should be grown together in order to ascertain what sorts are most suitable for the object in view. For this purpose samples were obtained from all over the Colony, and without naming them all, it may be said that of the forty-three samples experimented with, twenty-five were obtained through the kind co-operation of the Civil Commissioners of the Transkei, while others were obtained from Lower Albany, Graaff-Reinet, Humansdorp, Longkloof, and Knysna, while five were courteously supplied by the Agricultural Department of the Transvaal.

It would serve no good purpose to publish at length the observations made from time to time on each plot, suffice it to say that the differences were very marked indeed, both as regards earliness of maturing and the character of stem and leaf. The crops were sown in the middle of October, in drills, thickly, so as to secure a maximum of fodder per acre, not the conditions favourable to grain production. The ground was kept loose by hoeing until sheltered by the mealies themselves. The mealies were cut green and fed to dairy cows in January, February and March.

The results here given can only be taken as indicating what mealies did well in the South-Western districts, and for the purpose indicated, not as a proof of absolute or universal superiority.

Taking first the mealies which are particularly quick-growing, for a succession of green crops is of extreme importance in the case in point, the earliest was a mealie, the correct name of which is unknown, but which is grown in the Knysna, where it is called "Italian", and which was imported recently from Monte Video. In ten weeks from sowing it was in flower and the leaves were fine, smooth and luxuriant. "Murray's Perfection," a mealie introduced a few years ago by Mr Walter Murray of Roodebloem, Graaff-Reinet, also grew very fast, and is of excellent quality for the purpose in view. Samples from Humansdorp (sour veld), Longkloof, and Mount Ayliff, in the Transkei, were on the other hand exceptionally late.

At the commencement of February, when the veld in the Stellenbosch district is apt to be very scarce, the following kinds were doing well, and are arranged in descending order of relative merit:—"Murray's Perfection"; "Italian"; a yellow mealie from Flagstaff, Pondoland; three samples from Lady Grey; yellow mealie from Cofimvaba; "Golden Beauty" from Umzimkulu; a Tsomo yellow mealie; while "Hickory King" from several places; white and large yellow mealies from Mount Ayliff: the Kaffir mealie from Umzimkulu: and of imported varieties only one, "Blunt's Prolific," deserve favourable mention.

On the other hand several varieties including that bought locally proved very inferior· White "Brazilian" and "Botman's" from the Transvaal and samples from Humansdorp district also are evidently unsuitable for the purpose in view.

A final inspection on the 1st of March of this year, showed a "Geel Blinkpit" mealie, grown in Knysna, to be the best for late feed. At previous inspections, though healthy, regular and of good quality, it had on account of its lateness not been noted as specially good, however it was quite the best at this late season, when other green food would be very hard to get. Another Knysna variety: the "Italian" already referred to, and "Murray's Perfection", the Mount Ayliff, the large white from Lady Grey, the Tsomo and Flagstaff samples, "Hickory King" and "Golden Beauty" maintained their reputation.

Although not sown with the intention of producing grain, a small part of each plot was allowed to ripen so that the cobs might be seen and compared. Under these conditions of growth, of course none could be classed as excellent samples, but the best were the "Italian" and "Geel Blinkpit" from Knysna, "Murray's Perfection", "Hickory King", yellow mealies from Tsomo, a small yellow from Mount Ayliff and Cofimvaba, and a white mealie also from Mount Ayliff Having all been sown side by side, the seed is of course unfit for further experiment of this nature.

It is a regrettable feature brought out by this experiment, that so few definitely named varieties are obtainable in the Colony, and that the qualities of different kinds are so little appreciated. Farmers are apt to use whatever seed is easily obtainable, when after a simple trial of several different kinds they may find something very much better suited for their purpose, and with the same labour and land, much more remunerative.

UNITED VINE AND FRUIT-GROWERS' CONGRESS.

EAST AND WEST AT OUDTSHOORN.

(*Continued from page 825, Volume XXVI.*)

SECOND DAY, WEDNESDAY, MAY 17TH.

Congress commenced work at 9.30 and the discussion on Mr. Lategan's motion re liquor was resumed.

Mr. Landry said that yesterday they were asked to assist the wine-farmers of the West by increasing the duty on the imported liquor from 15s. to 21s. per gallon. They thought by that that they would be encouraged to produce a good article. But now they were inducing them to produce an inferior liquor. In the days when the natives could obtain liquor they generally had an untrustworthy lot of servants whom they could not send out for fear they might become intoxicated. He thought he was voicing the feelings of the Eastern people when he said that they were not at all in favour of the natives being supplied with any liquor whatever. Before they thought of doing anything to assist the native they should look round on those unfortunates of their own colour who could not restrain themselves when a bottle of brandy was put in front of them.

Mr. Krige said it was not the desire of the wine-farmer to produce an inferior article and sell it to the native. They wanted to supply a good light wine. Brandy demoralized the native but light wine would not.

Mr. Page said he kept as many natives on his farm as most of those present and he knew that although these restrictions had been proposed, the native had as much beer as ever he could consume and farmers knew that when he, the native, got intoxicated on beer it was much worse than Cape Dop. He said, give the native as much drink as he liked. Don't protect them, but protect the white men who craved for liquor.

Mr. Cillie said it was different when a boy got drunk in his master's cellar and when he got drunk in a canteen. If he was allowed to get a light class of wine it would keep him from drinking kaffir beer or Cape smoke.

Mr. Taylor said his experience had been that you could only trust the native up to a certain point. When he was in Wellington one of the first things that struck him was the low grade of natives there. He thought that by introducing a light wine it would be the thin end of the wedge, and they would not know where it was going to stop.

Mr. Pickstone differed from the last speaker. He employed 50 boys on his farm, and had not given a drop of wine for twelve years. He was practically in favour of the motion. They must give some chance for the native to rise and do well in the country, and he moved as an amendment: "That Government be requested to make a test in certain areas in the Cape Colony and native territory as to whether it is not a sound and economic principle to introduce the sale of light natural wines amongst natives under such restrictions as Government may consider necessary."

Mr. Goulden did not think they were justified in that description of class legislation. He wished the motion to be presented in another form.

Mr. Pickstone withdrew his amendment.

Mr. Cillie moved: "That a committee be appointed, two from the West and two from the East, to draft a resolution acceptable to the whole Congress, the committee to consist of Messrs. Flanagan, Landry, Lategan and Pickstone."

This was agreed to and the discussion adjourned.

COLONIAL LIQUORS AT SHOWS.

Mr. Cillie moved: "That in giving out liquor contracts on Agricultural Show Grounds a clause be inserted that adequate provision be made for the sale of Colonial liquor, if possible in separate bars, and that no Government support be given to any show that is not prepared to make such provision."

Mr. Leighton seconded.

Mr. Cillie maintained that encouragement should be given to Colonial industries.

Mr. Krige said it was a step in the right direction.

The motion was carried.

"BLACK SPOT" IN APPLES.

Mr. Pickstone, referring to blackspot, said that so far as he was aware there was no black spot in this country. In Australia it was a very serious disease indeed, and affected pears as well as apples. They should take reasonable and proper steps to protect themselves. Owing to the ravages of the disease in Australia the export apple trade between Australia and England was practically doomed, and he thought they should take every possible step to obviate such a calamity in this country. He moved: "That this Government take immediate steps to have an inspection at the Docks of all apples and pears landed at the several ports of the Colony from Australia, and they notify to the Federal Government that such steps are being taken as a precautionary measure against the introduction of black spot in apples and pears—a disease as yet unknown in South Africa."

Mr. Taylor seconded.

Mr. Goulden said this was a matter of very great importance, and he had much pleasure in supporting the motion.

Mr. Mally (Government Entomologist) said that it would be a very difficult matter to inspect fruit at the ports with any degree of success. They should look to it that proper regulations were made to keep the disease out. It was only a question of time before blackspot was introduced anywhere, because it was extremely difficult to inspect all cargoes. He thought it would be best to stop fruit being exported to this country from infected countries.

Mr. Pickstone said that with the permission of Congress he would like to withdraw his resolution, and introduce a new one on the lines of Mr. Mally's suggestion.

This was agreed to.

IMPORT TAX ON FRUIT.

Mr. Cillie moved: "That an import duty shall be levied on all fresh fruit imported from over-sea into the Colony, preference, however, to be given to Canada and other British possessions." He said that the Argentine Republic was coming into the market with citrus fruits, and it would not be long before they dumped insect pests as well as fruit on South African markets. They should take fruits from the Australian colonies and British possessions, but he did not see why they should do it in other cases.

Mr. Mostert seconded.

Mr. Lategan was in favour of the motion, but questioned whether it could be done under the present Customs Convention.

The Chairman said he did not think it could, at the present time, but the Convention would only last another two years.

Mr. Mayer read the correspondence between the Western Province Horticultural Board and the Government on a similar resolution passed at last year's Congress.

The motion was carried.

CODLIN MOTH.

Mr. Landry said that at the Congress held last year in the Eastern Province some discussion took place *re* Codlin Moth. He now moved: "That this Congress affirms the resolution made by the Eastern Province Congress last year, on the suggestion of the Agricultural Department, that the district of Cradock be included in the infected area."

Mr. Leighton seconded.

Mr. Lategan said he would like to know whether the areas cut off in the Eastern Province were clean of Codlin Moth. There was nothing positive before the meeting, and they might be infected.

Mr. C. W. Mally (Government Entomologist, Eastern Province), who was received with cheers on rising, said he had been working for the past eighteen months on insect pest work generally in the Eastern Province with his headquarters at Grahamstown. In getting about from place to place he had lost no opportunity of examining for Codlin Moth, and so far had not been able to find any infection east of the midland line of railway except at Cradock. Some time back Mr. James Butler of Cradock forwarded him some specimens, but he said nothing at the time as he thought it might be a new infestation. Recently, however, he had been able to make a personal inspection, when he found that the Codlin Moth was well established there, the infestation being spread as far as the Government farm Driefontein, some three miles out of the town. He has inspected round Grahamstown, Bathurst, Queenstown and East London districts, but in no case has he succeeded in finding the

UNITED VINE AND FRUIT GROWERS' CONGRESS AT OUDTSHOORN.

Back Row (from left to right): K. Taylor, C. W. Mally, Govt. Entomologist for Eastern Province, H. Flanagan, J. Lautscher, F. Willows, O. van der Westhuizen, P. J. Cillie, J. Landrey, jun., J. Leighton, F. A. Coulter, W. A. Krige, W. H. Litegan, W. Taylor, P. Hivers, and A. Page.

Front Row (from left to right).—H. E. V. Pickstone, J. W. Venables, A. M. Mostert, I. Pillans, Horticultural Assistant, W. Goulden, E. T. L. Edmeades, President, C. Mayer, Secretary, F. D. MacDermott, Editor *Agricultural Journal*, F. Versfeld, F. Muller, Rev. and T. Micklem.

Codlin Moth. He has not made a special tour of inspection for that purpose, but these casual inspections have satisfied him that this moth has not as yet penetrated these districts. The whole problem, therefore, turns in this way. The Codlin Moth is well established in the Western Province and has gone as far east as Prince Albert, and even penetrated to Cradock. It is possible that it may be east of the Midland Railway, but of this he has grave doubts. This pest therefore may be said to threaten the fruit growers of the Eastern Province. But it was his unpleasant duty to inform them that they had in the Eastern Province a pest of the same description that was as destructive to oranges as the Codlin Moth is to apples and pears. This he described as the Orange moth. A letter recently received from the Natal Entomologist emphasised the importance of this orange pest. The returns shew that this moth continues to hold its place as an important insect pest in Natal, and, as it is making its way from Natal through the Eastern Districts, the Western growers of fruit must take this into earnest consideration. Close on 400 tons weight of citrus fruits were sent out last year by the Oudtshoorn growers, while further west citrus cultivation was also a very important factor. In his opinion it was their duty as fruit growers, in the face of the facts as they stood, to disregard any idea of a prohibition line, but to consider the question of pest legislation as a whole. (Hear hear). The one pest is going one way, the other is going the other way. He then explained that the Nurseries Inspection Bill had gone through the House of Assembly, and was before the Council. An amendment had been suggested to clause 12, which would give powers to the Governor to proclaim regulations for the control and checking of insect pests, and he trusted Congress would support that as it would be best for all concerned. He placed this before them with a view to giving the Government a chance to make provision for the future as early as possible, as this should help them to make a beginning in the direction of the much-needed insect pest legislation. (Cheers).

Mr. Cillie moved that a Committee be formed to come to an understanding on the matter.

Mr. Lategan seconded.

Mr. Goulden did not see the necessity of a Committee at all.

Mr. MacDermott said they all knew how stock diseases had spread in this country, and he was certain that it was only a question of time for the Codlin Moth to spread. They could never guarantee that the moth would not cross a given line. It would be much better to come to some general understanding by which they could recommend and urge upon the Government to put into force such regulations as would compel the destruction of the Codlin Moth wherever it was found. (Hear, hear.) They should drop all question of personal interests in a matter like this, and try to co-operate on reasonable lines for the common good.

A Committee was then appointed, consisting of Messrs. Goulden, Flanagan, Taylor, Micklem, Landry, Mally, and MacDermott, with the Chairman.

As a result, it was decided to send the following telegram to the Prime Minister: "That this Congress of United Wine and Fruit-growers' Associations of Cape Colony learns with the deepest gratification that the Hon. the Legislative Council has passed the third reading of the Nurseries Inspection Bill, with the important amendment introduced to clause 12, and sincerely hopes that the said Bill with the said amendment will receive the same consideration by the Hon. the House of Assembly, and that it may become law before the close of the present session."

FRUIT EXPERT WANTED.

Mr. Goulden said that with regard to the appointment of a fruit expert, the Eastern Province was still in what might be termed an experimental condition. Mr. Pillans had done a very great deal for them, and the Eastern Province owed much to him. They were glad to be able to say so much. But Mr. Pillans had such a great deal to do that it was impossible for him to go round the Colony thoroughly. If he started on January 1st, he would return with only half his work done on December 31st. (Hear, hear.) It was an absolute impossibility for any one man to do the work. He moved: "This Congress urges that the existing expert, together with a limited number of assistants, shall devote their whole time to the work of investigation for the purpose of advising fruit farmers in each separate district and locality of the Colony."

Mr. Pickstone seconded, and said he was sure that a great deal of money could be saved every year by so doing.

Mr. Leighton thought it would be much better if they had a practical expert stationed in the Western Province, another in the Eastern Province, and, if possible, another in the Midlands.

Mr. Havers said that, speaking for the Western Province, he was quite sure that they did not require an expert.

Congress then adjourned for lunch. After lunch,

Mr. Leighton moved: "That Government be asked to appoint a thoroughly qualified expert for the purpose of advising farmers and fruit-growers in the Eastern Province, that expert to be stationed in the Eastern Province."

Mr. Cillie said that in spite of what Mr. Havers had said, there was still a lot of knowledge wanted in the Western Province, and an expert would do a lot of good.

When the matter came to the vote, Mr. Goulden's motion was carried.

"BLACK SPOT" AGAIN.

The following motion *re* Black Spot was then submitted and carried: "This Congress, recognising the vital importance of preventing the introduction of the disease, known as Black Spot, in apples and pears, calls attention to the urgent necessity of prohibiting the importation of those fruits, fruit trees, and other articles and plants likely to carry the infection from all countries in which this disease is known to exist."

FRUIT EXPERIMENT STATIONS.

Mr. Taylor (Oudtshoorn), speaking on behalf of Oudtshoorn, said that at the present time they had not got a single orchard in the district that was a commercial undertaking. He thought they should wake up, and move in the matter. The citrus family of fruits, their principal product, had been assailed by insect pests, and were suffering in other ways. He moved that Government be requested to establish an experimental fruit station in the Oudtshoorn district.

Mr. Pickstone seconded, but at the same time thought that Mr. Taylor's resolution should fall within a very much broader resolution which the Congress should be prepared to come to. An unanimous decision on Experiment Stations had been a crying need for years and there was no possibility of the agricultural industries of this colony being put on a proper basis without them. They had a place called Elsenburg (laughter), and he believed there had been a number of experiments carried on there. They also had the Government Wine Farm at Constantia, but that was not an experiment station in the proper acceptance of the term. Proceeding, he said that in establishing a station it should be seen that a local man should be put in charge of it. What was the use of placing a perfect stranger in a valuable district to carry out experiments when perhaps they had gentlemen who were in positions to know the local conditions? (Hear, hear.) He felt that, unless something were done at once, nothing would be done. He moved a resolution to the effect that it was necessary, in the opinion of the Congress, to establish experiment stations. Mr. Lategan seconded, and Mr. Taylor withdrew his motion in favour of it.

Mr. Pickstone said he would like to have an opportunity of bringing up his amendment on the following day.

Mr. Goulden thought there was no need to adjourn. They were all agreed that they wanted experiment stations.

Mr. Leighton moved: "That this Congress urges on the Government the urgent necessity of establishing an experiment station at Oudtshoorn, and another at some convenient centre in the Eastern Province, for the purpose of demonstrating the best methods of cultivation, etc., in not only fruit, but all vegetable and economic products which are likely to become useful in the Colony."

This, however, was withdrawn in favour of Mr. Pickstone's amendment, which now became the original motion.

Mr. MacDermott said that the Government had had the matter under earnest consideration for some time, and had gone so far as to place a certain amount on the estimates on one ocassion, but this had been struck off. He understood the subject would be brought before the present session of Parliament again.

Mr. Micklem was quite in accord with Mr. Pickstone's amendment. In Victoria (Australia) there was an agricultural vote of £60,000, and there were fourteen wine stations. In the Cape

Colony the vote for the Agricultural Department was £380,000 and there was not a single experiment station of any kind. They ought to appoint a deputation to impress members that they were not going to do any longer without experiment stations. If they worked it properly they could get what they wanted.

Congress adjourned at a quarter past four.

THIRD DAY, THURSDAY, MAY 18.

On Thursday morning the debate was continued on Mr. Pickstone's motion, which was now submitted in the following form: "This Congress of Vine and Fruit-growers, being convinced of the necessity for the early establishment of small experiment stations throughout the Colony for fruit trees, vines, and economic plants, etc., most earnestly requests the Government to proceed with the initiation of a scheme to that end at as early a date as possible. And in the opinion of this Congress it is desirable that the management of such stations should be placed in the hands of selected farmers in the various districts, who should be subsidised by Government. Further, that all such stations should be directed by the Secretary for Agriculture under a general scheme of control, and that the first of such stations, if possible, should be placed in the district of Oudtshoorn."

Mr. Pillans said he would like to ask whether a few words could be added, so that with the station an educational orchard could be included, where young men might be trained in work connected with fruit farming.

Mr. Mayer said he thought there was no necessity for this. There was still the educational establishment at Elsenburg, and there were several farmers in the Stellenbosch district who would be willing to employ such young men.

Mr. Pillans: I should like to be put in touch with such farmers, as I have the names of 30 or 40 young men on my books.

The Chairman said he thought it would be better for the general welfare and benefit of fruit-growers to first establish their centre (hear, hear), and that would work out its own salvation.

Mr. Pillans: All right then, I withdraw.

Mr. Landrey said that there was a large quantity of wheat, manures, grass-seeds, etc., which were supplied by Government for experimental purposes, and he did not see the necessity of a station.

Mr. MacDermott said that the most earnest advocate of experiment stations was Dr. Nobbs, the Agricultural Assistant, who was the officer distributing these seeds, etc.

Mr. Venables said that the amendment which Mr. Pickstone had submitted was a most comprehensive one, and he quite agreed with the Chairman that the station would work out its own salvation. He would most certainly support it.

Mr. Van der Westhuizen did not see why the first station should be established at Oudtshoorn, which was a rich district. Why not select a poorer district?

On being put to the vote, the motion was carried unanimously.

CHEAP LICENCES FOR THE SALE OF COLONIAL LIQUORS.

Mr. Lategan submitted his amended motion on Colonial wines as follows: "In the opinion of this Congress it is most desirable that, in the interest of the wine industry, upon which such a very large section of our community is dependent, cheap licences be granted for the sale of natural Colonial-grown wines only; and that the Adulteration Act should be strictly enforced by Government on Colonial-grown wines and brandy."

The motion was carried unanimously.

NAMED VARIETIES OF FRUIT.

Mr. Havers, Stellenbosch, moved: "That in consideration of so many different names being applied to the same kind of fruit, this Congress recommends to the different societies holding shows to give prizes only to correctly-named fruits."

Mr. Versfeld seconded.

Mr. Havers said that the purpose of the resolution was merely a friendly recommendation.

Mr. Cillie said that, in naming fruit, they were often between the devil and the deep blue sea.

The resolution was carried unanimously.

RAILWAY RATES ON MANURES AND FERTILIZERS.

Mr. Taylor moved: "That the railway rates on manures and fertilizers be reduced to a minimum." He contended that manures, etc., should be carried at almost a losing rate, as it would pay in the long run by increasing production.

Mr. Mostert seconded.

Mr. Venables supported. He thought that it was in the interests of the country that its resources should be fully developed, and that could not be done without fertilizers and manures.

Carried unanimously.

C.S.A.R. RATES ON COLONIAL PRODUCE.

Mr. Havers moved. "That the attention of Government be again directed to the excessive rates charged by the C.S.A.R. on Colonial Produce, whereby considerable loss is caused to producers." He said that, if the delegates referred to last year's report of the Congress, they would see that the whole subject was fully gone into then. It practically meant a tax on Colonial produce. Last year a committee was appointed to interview the Government, and see what could be done. He had no doubt that the committee had done their best, but they were still suffering.

Mr. Cillie seconded, and the resolution was carried without opposition.

TESTIMONIAL TO MR. LOUNSBURY, GOVERNMENT ENTOMOLOGIST.

Mr. Goulden, in the course of a somewhat lengthy speech, moved: "That this Congress heartily and gratefully expresses its appreciation of the services of Mr. Charles Lounsbury, Government Entomologist, to fruit-growers, and that a testimonial be presented to him; the Horticultural Boards of the East and West being requested to collect a sufficient sum and to appoint a committee to determine the character of the testimonial; also that Farmers' Associations be invited to join in the testimonial."

Mr. Micklem said the Eastern and Western Boards would have to work together. He would suggest that they collected their subscriptions, and then decide what form the testimonial should take.

Resolution carried with acclamation.

GUANO DEPOT FOR EAST LONDON.

Mr. Venables moved: "That a guano depot be established at East London." He said that their operations were considerably retarded for the want of suitable manures and fertilizers, and if they could only get a supply of this valuable manure within reachable distance of their farms it would be a great benefit.

Mr. Willows seconded.

Mr. Pickstone moved as an amendment: "That a guano depot be established at East London, and that the guano be sold at the East London store at the same price as in the stores in Cape Town." (Hear, hear).

Mr. Cillie seconded.

Mr. Venables withdrew his resolution in favour of that, and Mr. Pickstone's resolution was accordingly carried.

THE LOCAL STOCKING OF CYANIDE.

Mr. Willows moved: "That Government be requested to stock Cyanide of Potassium at East London and other Citrus growing centres, for the destruction of Scale insect by the gas treatment, so that Citrus growers in districts where no such depots are established can be enabled to send their orders through the Resident Magistrates, at whose office the amount could be paid for the quantities required."

Mr. Taylor (Oudtshoorn) seconded.

Mr. Mally said that the Agricultural Department would be only too pleased to meet the fruit growers in that way. He suggested that they should appoint responsible farmers in each district, to whom the Government could supply Cyanide of Potassium for distribution amongst farmers. There was always a good supply on hand. The resolution was carried.

COLONIAL LIQUORS AND FROZEN MEAT ON THE C. G. R.

Mr. Cillie moved: "That the Government be requested to push, as much as possible, the sale of the very best colonial liquors in the refreshment rooms and dining cars of the C. G. R. and that the Government be particularly requested to discontinue the use of frozen and imported meat." He thought this would be in the interests of not only the East and West, but the whole of the Cape Colony.

Mr. Venables seconded, and appealed to all present to vote for the resolution, and thereby support Colonial products and industries. The resolution was carried.

FARMING LITERATURE.

Mr. Taylor (Wellington) moved: "That, in the opinion of this Congress, the Agricultural Department be asked to publish any bulletins of farming interest received from other countries, both in Dutch and English, as pamphlets and that such be supplied gratis to all Fruit-growers' and Farmers' Associations for distribution."

Mr. Havers seconded.

Mr. Leighton thought this literature should be supplied at cost price.

Mr. MacDermott explained the magnitude of such an undertaking, and Mr. Taylor withdrew this, submitting the following resolution, which was carried: "That in the opinion of this Congress the Agricultural Department be asked to distribute its bulletins and pamphlets of farming interest in Dutch and English to all members of Fruit-growers' and Farmers' Associations free of charge on application."

WINE FARMERS' SALES.

Mr. Micklem moved: "That this Congress is of opinion that Parliament should be asked to reduce the quantity of wine which the wine farmer is able to sell from eight gallons to two gallons."

Mr. Lategan seconded, and the motion was carried.

WANTED: A MYCOLOGIST.

Mr. Leighton moved for the appointment of a Government Mycologist, and Mr. Flanagan having seconded the motion, it was carried.

This concluded the agenda paper.

WINE MAKING AT GROOT CONSTANTIA.

Mr. Krige said there had been a rumour that sugar was used in the making of wine at Groot Constantia.

Mr. Mayer said he recently sat on the Commission enquiring into the conditions of the Wine Industry, and Professor Hahn had stated that sugar was used.

Mr. Lategan moved: "That the attention of the Western Province Horticultural Board be drawn to the allegations as to the use of sugar for wine-making at Groot Constantia with a view to further enquiry and action thereon."

Mr. Krige seconded.

Mr. Cillie opposed. There was a Committee sitting on the question, and the report of the evidence was in the hands of the Government. It looked as if they were going behind that report.

Mr. Mayer: The evidence before the Commission was published in the papers.

Mr. Micklem also opposed. The allegations were simply hearsay, and he thought Congress should take no notice of it.

Mr. Mayer was very much surprised at Mr. Cillie. The matter was published in the press. As regards sugar he had asked Mr. Dubois last year whether he used it, and had received an answer in the affirmative.

Mr. Pickstone Is it not possible that the addition of sugar may be of advantage in the making of wine?

After some further discussion the motion was carried by 13 votes to 4.

NEXT CONGRESS.

Mr. Micklem renewed his invitation for next year's Congress to be held in Cape Town, and it was decided accordingly.

The proceedings then terminated with the usual votes of thanks.

CATTLE FARMING IN SOUTH AFRICA.

The following paper was read by Mr. Walter A. Edmonds before the Komgha Farmers' Association on May 20:

Mr. Chairman and Gentlemen.—Your President has asked me to read a paper at this meeting, which I have much pleasure in doing, as it is only by such means and discussions and leaving politics alone, that we can gain a benefit from our Associations. I have chosen cattle farming, a subject we all take a great interest in, and for which our Komgha district is so eminently adapted, which always strikes me very forcibly after visits to other parts and in other countries. Here we have abundance of grass, upon many farms that best of grasses, the rooi grass, being so conspicuous; we are well watered, plenty of natural shelter, and more or less in a frostless zone, enabling us by camping and judicious burning to have a good natural pasturage all the year round.

When in Europe a few months ago, I saw a good deal of farming in different places and under various conditions.

What struck me forcibly was the fact that if under such circumstances as big rents, high wages, artificial feeding and manuring, these people can not only make a living, but a profit, we ought to be ashamed of ourselves if we cannot make a fortune, as the value of ordinary cattle is about the same here and in Europe. You will say how about diseases, South Africa being cursed with all the known cattle plagues of Christendom and of a great many deadly specialities of her very own. Yes, this is undoubtedly so, but these diseases can be much diminished and shorn of their terror by fencing, paddocking, quarantining, burning carcases, burning the grass at the right time, keeping the cattle in good condition, and last, but not least, waging war upon all ticks—made so easy now that dipping cattle is in vogue.

We make many mistakes in our system which, in many cases might be improved very easily. To begin with, how many of us know.

WHAT WE ARE BREEDING FOR.

or have a clear definite point in view? Are we breeding for the dairy, cheese, beef, or for general purposes, by which I mean hardy cattle, the cows fair milkers and the oxen good trek cattle? If for the dairy you must breed from a dairy strain, such as Jersey, Ayrshire, Friesland, etc., and at certain times feed artificially. If for cheese from the Friesland, Ayrshire, etc., feeding artificially in bad times. If for beef, from the Shorthorn, Hereford, polled Angus, etc. If for general purposes, which, I think, is mainly done with us, we shall have to pick our bulls with great care, seeing that they come from the right stock. The bull should be of a good square shape, showing plenty of vitality and hardihood, as constitution under our farming conditions is the bed rock of success. I remember, upon one occasion, telling a farmer I did not think much of his bull. He replied, "Well, I will back it to fight any of yours." That farmer unconsciously expressed that it was hardihood he liked, and, after many years' experience, I have discovered he was quite right, the calves of such being stronger, enabling them to be reared easily.

There are several methods of cattle farming, ranching, dairying, grazing and general purposes, which can be carried out successfully in this district. Some of the big farms are very suitable for ranching, allowing the cows to breed naturally, letting the calves have the milk, the result being that both calf and mother are fat, the former growing out very quickly. Our indigenous cattle, in my opinion, are the best for this style. Go in for dairying if your cattle are the right kind; if you can market your products easily and you have plenty of labour.

GRAZING.

Buying thin (store) cattle, and fattening them upon our rich grasses, is a most payable proposition, especially if you are a good buyer and seller. Very much the same thing exists to-day as in times of old. When Cato was asked which was the most profitable form of husbandry he replied, "by grazing cattle well." Then being asked by what part of husbandry a man might get a tolerable income, he replied, "By grazing cattle indifferently," and, yet again, when asked the third profitable thing, replied, "By grazing badly." As to general purpose farming, even for this method good stock is preferable, although, as a rule, anything is thought good enough. Remember a little good is better than much inferior.

Now to general observations. Many never seem to wean their calves by separating them from the cows. This is a great mistake, as a big calf, especially in a bad season, easily becomes too great a drain upon the mother. If your farm is not big enough to separate the two effectually, send the calves to a neighbouring farm for a short while. By weaning your calves your increase is greater, as the cows being in better condition breed more rapidly. The cows in the district should have plenty of bones or bone meal given to them, as our soil is deficient in phosphates, the bone-forming substance. When in the Midland, some time ago, I was much struck by the calf per year per cow, which I attributed to a great extent to the amount of lime in the soil. Keep your heifers in a paddock by themselves. How often do we not see all sorts, sizes and conditions of cattle together. Do not let them take the bull until sufficiently grown. Some 2½ years old I find is the best time here, although in England the recognised time is 22 months, but our cattle do not mature at the same pace, ours taking almost another third of the time to mature. Keep your calves fat. If you want your cattle to grow out well never lose your calf fat, remembering that as much breed goes in at the mouth as into the bone.

The great secret with

REARING CALVES

is to keep them clean and feed properly. I believe half the calves die in this district through hair ball caused by dirt in the first place and bad management. If the mother is not too heavy a milker, I find that leaving the calves to run with their mother for six weeks gives them a splendid start. This can only be done when your veld is clean and free from ticks. I notice some of our farmers let their young calves out to grass at night time only, and meet with great success. Personally I prefer to let them into a small well-shaded paddock day and night, where there is no water, so that they cannot over-drink themselves during the occasional oppressive heat, the grass with their mother's milk giving them until, some six months old, all the moisture they require here on the coast. On the coast, where as you know the tick abounds, for calves a weekly overhaul is necessary, for bigger stock fortnightly, during summer; in winter the ticks not breeding so rapidly, less often will do. The young oxen also do all the better kept by themselves, as also your dry cattle which thereby lead a calmer life and consequently as founders of your stock suffer less. What a capital district this is for beef, especially the Kei portion! I have heard it stated that the shipping companies agree that the beef obtained at East London was more like the best English than any elsewhere obtainable in the Colony. I well remember my old friend and that good farmer the late Mr. George Gray, saying that upon one occasion when exhibiting a beast at a show, a good judge would and could not believe it was only off grass and had not been stall fed.

You will grumble that I have written a lot, but have told you nothing definite as to what and how to breed the most suitable class of stock under our existing conditions. Of course not, for this very good reason, that each farmer taking his own surroundings, conveniences, requirements, class of country and pasturage into consideration, must be a law to himself, but still noting what others have done.

Personally I think we do not appreciate sufficiently the

VALUABLE BREEDS OF CATTLE

we have in this country, such as the Afrikander, Pondo, Zulu, which by selection and careful breeding may be made much of. The tendency is to fly too much to some of the English and Continental breeds, forgetting that although England is the cradle and nursery of splendid stock, that her 23 different breeds, were originated to suit different conditions of their respective localities. All stock is there raised at an altitude of under 2,000 feet and upon a very restricted area. Our area is ten times as big and our altitude varies from sea-level to 2,500 feet in this district to 7,000 feet in some parts of the Colony. Bakewell, the great Shorthorn breeder, said that small boned cattle, if they be of good quality and constitution, are far better than a large coarse breed. Well, gentlemen, this is where we go wrong. By injudicious crossing, we too often get the large coarse breed. Better by far if we stick to our own hardy, medium sized cattle suitable and accustomed to our variable conditions. The Afrikander, Pondo, Zulu are good cattle in their different ways; any attempt to bring these cattle to the high plane of value which is their natural right should meet with every encouragement, and might be well attempted by some of us. Hitherto little or no systematic effort has been made to improve these valuable native breeds. Such efforts, I am sure, would be rewarded by most interesting and profitable results.

WE WANT MEDIUM CATTLE,

not heavy, otherwise you start playing at cross purposes with nature, as we must have cattle to exist under our conditions, and who will forage for themselves. Every paper I take up says such and such a breed is the right thing for the country, as if any breed could possibly do best under such a mass of very different conditions, the upshot being, we are too prone to look around instead of moulding our own into the ideal. It is a notorious fact that imported cattle lose their original characteristics unless artificially fed and sheltered, so unless you mean to pay great attention and artificially feed in this district keep to the Afrikander and make it a credit to us all. Gentlemen, I shall be glad if you will discuss this paper, pull it to pieces and condemn it if you like, but if you wish to repay one for some little exertion in preparing it, do not treat it to the usual expressionless vote of thanks.

THE SOUTH AFRICAN STUD BOOK.

Mr. C. G. Lee, Secretary of the Cape Stock-breeder's Association, writes:—

The Cape section of the South African Stud Book has had an addition of fifteen members (since I wrote you last), these being breeders of Horses, Cattle, Merino Sheep, Persian Sheep, Angora Goats and Pigs. The Angora section of the Association is now hard at work, having the valuable goats inspected for registration. Thirty-two flocks are being submitted for examination.

The admission of foundation flocks of Merino Sheep, after *one* examination, has been accepted as necessary by the O.R. Colony, Transvaal, and Cape sections of the Stud Book. Three highly qualified merino sheep inspectors for the Association have been appointed, who are all practical sheep farmers, and possess a life-long Colonial experience. There seems to be a need for a qualified wool sorter or sheep grader. This would facilitate the work considerably and give the younger sheep farmers much help.

Fifty-two entries of pedigreed cattle have been dealt with, chiefly "Lincoln Reds," "Ayrshires," and "Jerseys."

The Persian Sheep section have made twenty-five entries in the manuscript Stud Book.

Important circulars have been distributed to members dealing with forming a standard for a South African horse and Afrikander cattle. These emanate from the Transvaal section of the South African Stud Book. The object in distributing these circulars to members is to get a consensus of opinion upon a standard to be formed for these valuable animals by all interested in such stock.

A great regret exists, however, that there are so many well qualified to give an opinion—especially upon the South African horse—who are not members of the Association, and, therefore, their names and addresses are not on the Association's book, to enable the Secretary to communicate with them. Nevertheless, some few who happen to be known have been asked for their views. But the country cannot afford to lose one helping hand in this important work of building up a pedigreed South African horse, let him be a cross to begin with, or let him be whatever the breeder wishes to breed, provided he has a definite standard to aim at or object in view which he can describe and lay down as a standard.

There may be different types of the South African horse, for it is hardly to be expected that every breeder will find it to his best interests to breed the same identical stamp of animal, but with the Stud Book scheme to work upon, the aims of each can be clearly recorded in this public register and progress measured in every part of South Africa.

The action of the Transvaal section of the Stud Book must call for commendation, because, after their breeders had carefully considered the whole question of the standard for the South African horse and Afrikander cattle, they freely give the benefit of their work to the Cape section, and ask for suggestions. This shews a spirit of *real* co-operation, and for mutual benefit it must certainly be.

The Registration Board was present at the Agricultural Union meetings in Cape Town, to promote and protect the interests of the Association. And three measures bearing directly upon the Cape section of the Stud Book were unanimously supported and passed by the Union. 1st. That Government continue to give the movement its support. 2nd. That the Association's recognised brand or mark and its common seal be protected against unauthorized use. 3rd. That in the event of the proposed International Agricultural Conference being held, that South Africa be represented. It should be unnecessary to say anything of the almost limitless possibilities for good to our South African Stud Book that should arise out of such a conference, if in some way we were represented, for there we could come into direct contact with the great Stud Breeders' Association of the world. Nor would the South African Stud Breeders' Association need to stand in the back ground, when it came to the point of area over which it operates—for do we not speak with one voice (through the South African Stud Book) from the Zambesi to Table Bay? However, there could be no wish to claim rights of speech, but there would be, at such a conference, claims pressed for greater co-operation amongst the stock-breeders of the world, which could have but one result, the distributing of knowledge pertaining to our business, the interchange of experiences, and the placing the ancient yet new profession of stock-breeding on a much higher level throughout the civilized world.

The further entries of stock number 168.

The vote of the Cape Stock-breeders' Association shews the following gentlemen as elected on the Registration Board :—Messrs. Hilton Barber, R. Pell Edmunds, E. R. Hobson, O. Fourie, O. Evans, J. Rawbone, and C. G. Lee.

The following letter received by the Editor of the *Agricultural Journal* was forwarded to Mr. C. G. Lee, the Secretary of the Cape Stock-breeders' Association :—

"FRISIAN CATTLE STUD BOOK.

To the Editor, *Agricultural Journal.*

SIR,—In a note on pages 4 and 5 of your *Journal* for January last, it is notified that a Cattle Stud Book is to be established in South Africa. Permit us, therefore, to offer you, as a kind of guide for the Stud Book Association to be formed, the following :—

(*a*) The last four parts of the Frisian Cattle Stud Book ;

(*b*) A copy of the *Collection Book*, containing all the Stud Book Cattle in this Province on November 12, 1904:

(*c*) A few reprints of the directions shewing the method in which our Stud Book is formed;

(*d*) Some pamphlets on Frisian Cattle, with illustrations.

Should the Directors of your Stud Book wish to receive other parts of our publication, we shall be very glad to forward same on application.

On the other hand, we should esteem it a great favour to receive anything your Directors may publish in connection with the Stud Book, as well as the Rules and Regulations of your Association.—We are, etc.,

C. VAN EIJSINGA, President,
D. VAN KRUIJNENS, Secretary."

SPRAYING vs. DIPPING.

INTERESTING PAPER.

At the last meeting of the Koonap Farmers' Association, held at Fort Brown, an interesting paper on the subject Spraying versus Dipping was read by the President, Mr. A. W. Douglass. The paper was as follows:—

GENTLEMEN,—In reading this paper to you to-day, I do so because I think every member of your Association is deeply interested in the subject, in fact it means bread and butter to most of us, and because I think the destruction of ticks is the one most vital necessity which affects pretty well the whole of South Africa; and I hope you will freely criticise what I have written, as I think a good, wholesome debate cannot do anything but good. I think I am qualified to speak on this subject, as in conjunction with my father we were the first to thoroughly tackle the tick scourge, and after endless experiments with every then known dip, oil, and different concoctions, all proving failures, we gave that demonstration at Heatherton, at which some of you, I think, were present, when we sprayed with pure paraffin, and proved for the first time that ticks could be killed with success. But we then knew that during cold and cloudy weather, and during winter, the pure paraffin caused slight injury to the skin of the animal. That was seven years ago. Well, gentlemen, soon after that we patented a pump to spray 25 per cent. of paraffin and 75 per cent. of water. This causes no injury to the cattle, in fact it does them good, and kills every tick. There are hundreds of these pumps in use in all parts of South Africa to-day, and I think very soon there will be thousands. I will not go into the life history of the tick, because, thanks to Mr. Lounsbury, the Government Entomologist, who has carried on some marvellous experiments with ticks during the last five years, the subject is well known to all of us, and Mr. Tomlinson is also reading a paper to-day on ticks, so I will confine myself to their destruction.

As you all know the tick goes through practically the three stages—the egg, the larvæ and nymph, and the adult. The most important part of their lives in regard to their destruction is the latter stage, as, luckily for us, they cannot possibly breed or mature except on a warm-blooded animal, and in the last stage the female takes from fourteen to twenty days on the animal before she becomes fully enlarged and ready to drop off to lay her eggs. It is during this last stage, when the female is maturing on the animal, that we get our only chance of exterminating them. Kill every female tick before she drops off the animal, and the farmer is bound to clear his land—in time. But I am sorry to say, gentlemen, that you must not expect to obtain this end without systematic and careful spraying. He will not clean his farm in a year, or two years, but he will obtain the benefits of his labour after the first summer's work, because he will have greatly reduced the ticks; but at the end of three or four years he will have a clean bill of health. He will have to spray regularly every fourteen days in summer and once a month in winter. He must never get slack and say, "There are only a few ticks, I have other work so will let it run over this time," because every female tick that he allows to drop off alive lays between 2,000 and 10,000 eggs, sufficient to restock his farm.

With paraffin spraying, if carefully and properly carried out, is absolute death to every tick, and no female can possibly escape a spraying alive. Now, as regards dipping, the only dip that will destroy ticks must contain a very large percentage of arsenic, a deadly poison, and even then a large number of engorged females escape. Why this is I do not know, but I think the explanation is that the arsenical dips cannot be used in sufficient strength to penetrate the thick skin of the matured tick to kill it, without seriously injuring the animal, whereas paraffin, with its highly penetrative power, kills the tick, but evaporates so quickly that no damage ensues to the animal. Now arsenic is a deadly poison, and is fatal to man and beast if taken in sufficient quantities, either through the mouth or through absorption of the skin. This being so, and the fact that cattle must be dipped every 14 days to be effectual, I think it far too risky and dangerous to become a common practice; and I maintain that it is impossible to dip the same cattle as constantly as is necessary: that is to say, every 14 days for perhaps three or four years, if a farmer wishes to clean his farm.

On the other hand, paraffin and water mechanically mixed by our pump is absolutely uninjurious; in fact it does the skin of the animal good, and is an excellent disinfectant for mange and sores of all descriptions. I have sprayed personally from 25,000 to 30,000 cattle in all stages, from four months old calves up to the oldest cow.

Some of these animals have been sprayed from 70 to 100 times, and I have never injured a single animal, either in the race or through the action of the paraffin. I will now come to the cost of spraying versus the cost of dipping :—

Spraying 100 Cattle :

25 per cent. paraffin, 75 per cent. of water.			s.	d.
1½ Cases of paraffin, at 10s. per case . .			15	0
Less sale of box 6d, sale of 3 tins 9d ...	1	3		
Paraffin recovered after spraying, say 1 tin ...	2	6	3	9
			11	3
Cost of labour, water, etc, 5s.			5	0
			16	3

which works out at a cost of about 2d. per beast.

The cost of dipping is more difficult to arrive at, but all dipping tank committees are charging 3d. per head, but allowing it at 2d per beast is, I think, approximately correct. To this, we must add for spraying the initial or first cost of a race and two pumps, which would cost about £15. To the cost of dipping we must add the building of a dipping tank, say £150, and then we have the no small item of filling the dipping tank with water, which takes about 3,000 gallons of water, and which in these severe droughts is often hard to obtain. The same amount of labour, about six or seven men, is required to spray or dip, and it takes about the same amount of time—70 to 80 head an hour. Let us look at the matter in a broad light; if we are going to clear our farms of ticks, every farmer must clean his cattle. How very few farmers, especially those with a few head of cattle, can possibly afford to erect a dipping tank, and it is impossible for a farmer to drive his cattle, say ten or twelve miles every 14 days to a Government or mutual dipping tank, in order to dip them; whereas every farmer could afford to buy a pump and clean his cattle. Not only that, look at the danger a farmer runs in picking up diseases, and other ticks, each time he moves his cattle to and fro to that dipping tank. I, for one, and I am sure every one of you farmers here, would strongly object to having strange cattle driven through his farm every fortnight. I am perfectly certain that a farmer would sooner under these circumstances have the ticks than be continually driving his cattle to tank. I cannot conclude this paper without blaming the Government and the Veterinary Department for not thoroughly experimenting with these arsenical dips, and warning farmers of their danger; whereas, on the other hand, by contributing half the cost of the tanks, and urging the farmers to dip, and leading them to believe it was perfectly safe and an absolute success, but of which there are now grave doubts. The Koonap Association was the first, through their meetings and through motions to Congress, to urge upon Government the importance of the tick question, and I am glad to say that our consistency is now bearing fruit, and Parliament a few days ago, as you will have noticed, had a big debate on the subject, where it was clearly shewn that they realize that steps must be taken to eradicate the tick. The Veterinary Department are fond of pointing to Queensland, and saying dipping is a success there, so it must be here. Well, gentlemen, Queensland is a far-off country, where they have no bont ticks, and where we have no exact information of what they are doing. I know that in Rhodesia and Natal, where they built tanks two or three years ago, those tanks are practically lying idle to-day.

I must not take up any more of your time, but would like to add in conclusion that I cordially invite members of the Koonap Association and their friends to come to Heatherton, and see a spraying in process, and also to see our cattle after five years' cleaning. I cannot promise to show you many ticks, because we have practically exterminated them, but we were about as badly infested a farm five years ago as you could find in South Africa. It is for you to name the day and Mrs. Douglass and myself will only be too glad to receive you.

At the conclusion of the paper which was listened to with the greatest interest, a considerable discussion followed.

The Chairman thought perhaps the cost of a dipping tank had been over-estimated. He also believed that the water difficulty could be minimised,as the tank once filled did not require much more water.

Mr. C. J. Fletcher admitted that the paper contained some useful information, but contended that it was out of date. Mr. Douglass had said that as long as the female tick was killed it was all right, but he (Mr. Fletcher) believed that if only the tick was killed when young they would exterminate it. Results of dipping experiments carried on on his farm for some months had been most successful and devoid of accidents. He felt pretty sure that, given seven years as Mr. Douglass had experimented, farmers would be rid of the tick by dipping. With regard to the experiments carried on by Mr. Lounsbury referred to in the paper, those had not in his (Mr. Fletcher's) opinion been fair, as the experiments had been made on sheep suffering from heartwater. The dipping by municipalities was, he said, carried on in a loose manner, and could be done more cheaply than at present. For his own part, he would undertake to put 400 head of cattle through in two hours. Blackleg and Sponsziekte had, he claimed, been overcome by dipping, as since starting dipping not one case of the former had occurred.

The Secretary asked Dr. Bowhill whether the Government had experimented with arsenical dips ?

Dr. Bowhill, in reply, said he was not in a position to give exact statistics relative to the experiments which had been carried on near Adelaide, but Government had taken steps to discover the relative values of the dips, some of which still remain to be tested. With regard to what had been said about Queensland, he had been there and seen tick fever, also in California and Australia and again in Rhodesia, and he hoped it would never be so bad here as in the last-named country. He felt that they were all indebted to Mr. Douglass, sen., for his crusade against ticks. With regard to the killing power of arsenical dips, he pointed out that animals could stand a much greater strength of solution so long as it was absorbed through the skin only, but that the danger lay in swallowing the dip.

Mr. J. A. Tomlinson, in regard to Mr. Fletcher's statement about being able to put 400 cattle through in two hours, suggested that his quickness was probably responsible for failures in dipping.

Mr. Fletcher said his own tank was so arranged that cattle could remain in it if necessary. He was inclined to deprecate galloping cattle through.

Mr. Fletcher raised the question of spraying ostriches for fly, etc., and asked whether, when the wings were raised, the insects did not fly ?

Mr. A. W. Douglass said he preferred dipping ostriches rather than spraying, as more flies were killed.

Mr. R. B. Marran mentioned experiments in spraying with Fletcher's tick dip which had been satisfactory.

The Chairman remarked that they had arrived at a satisfactory stage in combining spraying and dipping.

A vote of thanks was moved and accorded to Mr. Douglass for his interesting and instructive paper, and an adjournment was made for lunch.—*Grocott.*

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome.

Questions are also invited. In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month. Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible.

All letters or contributions should be plainly addressed: "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown;" they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith. A *nom de plume* may be attached for publication.

Weirs Across Streams.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—"Hope" asks the question, Has a man the right to build more than one weir in a river on his farm? If so, what about his neighbours below him?

This is a question which rightly should be put before a competent lawyer acquainted with the circumstances of each individual case, as each case must rest upon its merits.

I will, however, venture a reply. Should the weirs be built for the purpose of utilising perennial water, we have the law as it at present stands. The principle is, equal rights to all riparian owners on perennial streams (apart from consideration of prescription). That is, each riparian owner living on a perennial stream can use an equal fair and reasonable share of all waters flowing in such perennial stream, equal to those of his neighbours below him, consequently, a man can have as many weirs in such river as he thinks necessary, provided he does not use more than his rightful share. If the weirs are intended for the utilisation of flood water, there is at present, I believe, no law with regard to flood water (apart from consideration of prescription). A prescriptive right, I believe, would stand or hold good where flood water has been flowing on to a man's farm for over thirty years forming valuable vleys, lucerne and other fields, thereby greatly adding to the value of such property. But apart from prescription, much will depend upon the use made by the utilisation of flood water. For instance, a man would not be allowed to damage a lower proprietor by over-flooding or indirectly damaging him in other ways.

On the other hand, as it sometimes happens, the lower proprietors have, not only their lands flooded for them free of expense where they have not the opportunity of doing it for themselves, but they have their fountains much increased in strength, thus greatly increasing the value of their properties. Under such circumstances, the more weirs a man builds in a river the better for all parties concerned, and the better for the country, more especially so where the flood waters would otherwise run to the sea.—Yours, etc.,

W. R. SOUTHEY.

Varkenskop, May 10.

African Coast Fever and Heartwater.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the annual report of the Principal Veterinary Surgeon of the Transvaal, the following passage occurs:—

"This conception became the more probable when further enquiry demonstrated that the causal ticks were infected in their intermediate stages, that the infection did not pass through the egg of the tick to the second generation; *and that once a virulent tick had sucked on an animal it lost its virulence.* It is true, that although virulent nymphæ discharge their poison into their *first* host, they may take up a *fresh* dose should they happen to suck for a *second* time on infected oxen, and, of course, they would *then* be able to give the disease in their next stage. The *possibility* of their doing so, however, is *contingent* upon the appearance of a sick bovine host, within a more or less restricted area before their life period is exhausted."

In the weekly edition of the *Cape Times* of the 10th instant, Dr. Hutcheon is reported as speaking to the delegates of the Agricultural Union as follows:—

"Now, in the opinion of Mr. Lounsbury it would go through its normal stage and become infected as the larva, and in the nymph stage it would get on a horse or other animal, and probably be carried a hundred miles, where it might be dropped and picked up by some other animal when it had reached the adult stage, and go on to a susceptible sheep or goat, and in that way convey infection, in fact, African Coast Fever was very much like heartwater, and behaved the same way so far as the life cycle was concerned.

"Now, if this tick were to get on to a horse, or a sheep, or a donkey, in the *nymph* stage, and were to get on to cattle in the *adult* stage, it would be capable of communicating the disease, their experimental evidence bore that out."

There would appear to be conflicting opinions here. The late Principal Veterinary Surgeon of the Transvaal distinctly asserts that virulent ticks having acquired the infection in one stage, discharge their poison into their first subsequent host in their next stage, and thereafter are innocuous unless fed a second time on an infected animal in the same stage, after it has discharged its poison. A tick infected as a larva would thus discharge its poison as a nymph and be innocuous as an adult.

But Dr Hutcheon, quoting Mr Lounsbury, suggests that a tick infected as a larva could feed on a donkey, sheep, or horse, in the nymphal stage, and still subsequently convey the infection to cattle in the adult stage It would not, therefore, have discharged all its poison into the donkey, sheep or horse as a nymph, and would not be innocuous in its adult stage, unless we are to assume that it has fed a second time as a nymph on an infected animal.

Has it ever been proved that a tick infected in the larval stage has conveyed that infection in *both* the nymphal and adult periods of its life history? or have the experiments merely shewn that infected larvæ have conveyed the infection as nymphs, and infected nymphs as adults? The point might be of practical importance, and it would be interesting to have an explanation.—Yours, &c ,

INQUIRER.

Warrenton, May 15.

With respect to the apparent discrepancy between the statement contained in the annual report of the Principal Veterinary Surgeon to the Transvaal Government, and the statement which I am reported to have made at the meeting of the Agricultural Union held at Cape Town on the subject of the transmission of African Coast Fever by the specified ticks, I wish to state that there is no difference in the opinions which both entertain on this matter. But being a technical subject, it may have been difficult for the reporter to follow the details accurately, and in condensing his short-hand notes of my remarks, he evidently failed to catch the difference mentioned between the capabilities of the bont tick, which transmits the infection of heart-water, and the brown tick, which transmits African Coast Fever, especially as the life-cycle of each, is in all other respects closely analagous My object in referring to the fact, experimentally proved by Mr. Lounsbury, that the bont tick, which as a larva fed on an infected sheep or goat, and thus acquired the heart-water infection, could as a nymph feed on a resisting animal, such as a horse, mule or donkey, and yet be capable of communicating the infection to a susceptible animal in its final or adult stage, was to shew that it was the knowledge of this fact, with respect to the bont-tick, that caused us to frame our regulations for preventing the spread of African Coast Fever, on the assumption that the brown tick might possess the same power of retaining the infection through its nymphal stage, although that stage might be passed on a resisting animal, and be capable of communicating the infection to a susceptible animal in its adult stage The matter was of so much importance to the pastoral community that we could not afford to take any risk, so we prohibited the introduction into this Colony of *all* live stock from an infected area.

With respect to the question whether a tick, which becomes infected in the larval stage, is capable of conveying the infection to susceptible animals in both its nymphal and adult stages, Mr. Lounsbury informs me that he has obtained one or two positive results from his experiments, but as the great mass of his feeding experiments with these ticks have proved negative, he is not prepared to make a positive statement on the subject. The point of principal importance, however, is, does any animal, other than cattle, convey the infection of African Coast Fever? and the reply is, that all the evidence collected by accurate observation, and experiment in the Transvaal and Rhodesia, has convinced the veterinary experts of these colonies that ticks, capable of communicating African Coast Fever, could only be carried by animals, other than cattle, under very exceptional circumstances.—D. HUTCHEON.

Our Meat Supply.

To the Editor, AGRICULTURAL JOURNAL

SIR,—I gladly take the opportunity which Mr. Carlisle, in a letter in your June number, affords me of saying where I got my information from regarding the probable percentage of lambs reared in Hay Division

First of all I must correct an erroneous impression suggested by Mr. Carlisle's quotation from my article on the above subject. I did not say that the percentage of lambs reared in Hay is probably less than 50, but that *for every 100 ewes* the percentage of lambs reared is probably less than 50. Mr. Carlisle, being an intelligent farmer, will of course realise the difference. 'In making this correction, I do not wish to convey that Mr Carlisle misquoted me for any other reason than that, as he says, he had not yet been able to go through the article carefully.

My information was obtained from a number of sources, but it seems to me sufficient to quote two As Mr Carlisle well knows, Hay extends from the bluff of the Kaap plateau, past the Langberg, well into the Kalihari, and from the Bechuanaland border to the Orange River Within that large extent of country are several classes of veld—very good, good, indifferent and bad—healthy and unhealthy. The best part is the Langberg, in which locality Mr. Carlisle has his farm. But when speaking of Hay division, I must of course take into account also the Kaap range Now, Mr P. J Kriel, a near neighbour of Mr. Carlisle's—as distances are reckoned in our sparsely populated country—considers that in a good year he is able to rear "80 per cent. taking the ewes only ', but, he continues, "years have been known when we do not rear 30 per cent " He also gives the following answers to questions

"What percentage of lambs do you expect to rear?"—"At present (end of 1903) I have about 800 sheep and I have about 250 lambs."

"Only about half of your sheep would be ewes?"—"No, the proportion of ewes is much greater "

"How many ewes have you that can lamb?"—"Not less than 500 "

"Are 250 lambs the number you expect to rear from 500 ewes "?—"That is the number that have come in so far this season "

"More ewes are to lamb?"—"Very few."

I think Mr. Carlisle is likely to agree that Mr. Kriel is a reliable witness

I shall go next to the other end of the district of the Kaap plateau, and give what Mr James Turner says Asked as to how many lambs he can rear from 500 ewes until they were weanable he answered "90 per cent if there is no disease at all . . but I do not know how it is, in the lambing season two or three full-size lambs are dead every morning " Mr Carlisle will be able to judge, assuming that Mr Turner is correct, what percentage of lambs will be reared after the daily deaths, the deaths from disease and the loss from vermin are deducted Then we must remember that all farmers are not careful farmers, and that while one farmer will lose few lambs from tapeworm, for instance, another will lose a great many Moreover, losses are sometimes severe from *bloedpens* and *harslagziekte*. Then, too, I must point out that I dealt with *average* seasons

From lambs Mr. Carlisle passes to sheep, and quotes Sheep Inspectors' returns of deaths. I must say at once that I place no reliance on Sheep Inspectors' returns of deaths. They have no adequate means of collecting the information Griqualand West can lay claim to a list of diseases such as few other districts can It has *opblas*, *slanghop*, *giftziekte*, *lamziekte*, *harslagziekte*, *bloedpens*, *krimpziekte*, besides wireworms, tapeworm, and other diseases met with all over the Colony Mr F. W. Daniel, also a near neighbour of Mr. Carlisle's, lost one year 600 sheep from giftziekte in four months. At the same time I am glad to say that my information is that *among careful farmers* in the Langberg the loss is no greater than, say, in the Midlands

With regard to the number of small stock saved during the drought by farmers who trekked to Griqualand West, it is to the credit of this territory that it has staying pasture which can resist drought better than that of most districts; but it does not follow because food is provided, that disease is withheld There is no doubt that Griqualand West prevented a large number of small stock from dying of poverty, but let Mr. Carlisle travel among Prieska and Hopetown farmers who had trekked to Griqualand West, and let him ask them about losses from disease, especially among lambs.—Yours, &c.

P. J. DU TOIT.

Department of Agriculture, 14th June.

The Auracaria Excelsa.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Referring to the letter of Mr Howlett appearing in the June issue of the *Journal*, there is a good specimen of the Norfolk Island Pine (*Auracaria excelsa*) growing in front of the residence of the late Hon. James Harlwich, M.L.C., in Station Road, Komgha here. It is perfectly healthy, is over 70 feet in height, the branches and foliage being in fine condition springing laterally at about six feet from the ground. It is at present bearing a crop of cones. The elevation of Komgha is 2,267 feet above sea level.

The *Auracaria imbricata* (or Monkey Puzzle tree of Brazil) I have not met with in South Africa, but it was somewhat common as a decorative tree on lawns in Scotland a generation ago. One of the finest specimens which I have seen in respect of height and girth of stem stood in front of the Manager's Office at Carron Iron Works, Scotland, where it appeared indifferent to smoke and dust, as well as to the roughness of its surroundings, for it was not protected from casual contact with labourers and materials connected with the ironworks—being open to the road in fact. The smoke of the immense blast furnaces characteristic of these ancient Ironworks did not appear to affect the health of the tree. But last time I saw it is fully a quarter of a century ago, and it may be defunct by this time.—Yours, &c

A. D. CAMPBELL.

Komgha, 9th June, 1905.

Horses Suitable for Military Requirements.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I am rather taken aback with the above notice, in the *Agricultural Journal* of June, 1905. I did not think that the Military could expect the farmers in the Cape Colony to breed horses for their requirements, as they ought to know full well that all breeding horses that could not be used by the Military were ordered into protection camps during the war, and how many were returned to their lawful owners? I don't know of one in this neighbourhood.

I for one, have been more fortunate than a good many of my neighbours. I was allowed to keep all mares that were not fit for Military purposes.

Well now even in this case, all the best mares were taken, amongst which were some thoroughbreds

I also note that the Cape horse has established his virtues, and stands alone as the most suitable animal for service in this country Now, is not that a pity that the Military did not try to preserve some more of this valuable stock, as they were the very people who knew their value? In this district there are only three farmers who managed to save some of their breeding stock, and I don't think they will total more than about 75. The suggestion in the notice I think a very good one for the few who are able to supply the wants of the Military in the horse-flesh line. But at the same time I don't think that we will be able to supply more than about 12 horses suitable for Mounted Infantry purposes and not before 1909, as within the last two years no foals were reared in these parts —Yours, &c

KARROO

Hanover Road, June 10.

A Successful Operation on an Ostrich

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Noticing a six months' old ostrich chick not eating, I thought it sick, and dosed it several times The bird did not appear to be sick with any disease, but held its head and neck very erect, and seemed to be in pain I kept a good watch on the bird for five days; by then it was reduced from a plump body to a skeleton. I examined the neck and throat several times, but could not notice the least indication of any stoppage. Having concluded there must be a stoppage in the food passage where the throat empties in the stomach, I decided to operate by cutting a gash in the throat as near the body as possible. Having located the food passage, I opened it by another gash large enough to put in the hand, when I felt a large pineapple crown. Thrusting in again, I took out a piece of rib bone about three inches long, with a very sharp point at one end. This had stuck fast in the side of the food passage just where it emptied in the stomach, and had stopped the pine crown from going any further Mortification had set in around the wound. After putting vaseline and permanganate of potash into the wound, I sewed both the cut places up separately and dosed the bird with sweet oil, and let it go Half an hour after it ate a little damp bran, and has completely recovered. It is now in good condition again. I may state that I don't consider an ostrich s vallowing a pine crown any way injurious ; the fast bone was the cause of the trouble.

Will you publish this for the benefit of other ostrich farmers?—Yours, &c.,

CHAS. SPARROW.

Pinedale, *via* Grahamstown, May 15, 1905.

Destruction of the Lynx (Red Cat).

To the Editor, AGRICULTURAL JOURNAL

SIR,—I see in your issue of this month (vol. xxvi) a letter from Mr. J. E. Wright asking for a method to destroy the above carnivora. I have also had a lot of trouble with these destructive animals, and as they do not readily take to poison that has been handled, I tried the following plan, which answered very well in the majority of cases

I made a cage, the frame of ordinary deal cut 3 in. x 3 in., the size was 4 feet long, 3 feet wide, and 2 feet 6 inches high. I then covered it securely with netting wire, using a very small mesh and leaving a gate in the centre to close up the cage, working with a slide up and down the gate of the cage. This must be large enough to allow a lamb or kid, say four months old, to go into the cage easily Then take the cage to where the Lynx troubles you, and at sundown put a lamb or kid in the cage, and close it securely. Then set a good trap next to the cage, and cover it well up. Remove the flock with herd and dogs from the place for the night, and continue this for some time, taking out the kid of a morning and putting in another for the next night. I have caught several in the trap the very first night, but sometimes they come near the cage and get a fright, but ultimately they come so near in trying to catch the enclosed kid and going round and round the cage, they very soon get into the trap.

The floor of the cage can be made of thin flooring boards, and a little sand or ground thrown in the cage while using, to avoid the noise the kid makes in trying to escape from danger, which frightens the cat away.

Trusting that Mr Wright may be as successful as I have been,—Yours, &c.,

B. J. BURGERS.

Palmietfontein, May 12, 1905.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In answer to Mr Wright's query as to the best method of killing Lynxes, let me say that I have known these animals to take poison placed on the animals they have recently killed, but that I have got very satisfactory results from trapping with a No. 4 Leppan trap. On one occasion I got male and female on two successive nights on the same spot, and two of my neighbours have had luck to get two Lynxes at the same time in two traps set alongside one bait. With Lynxes one has to be very persevering, as they are so erratic in their movements, often never returning for a second feed even when several animals have been killed. As Lynxes hunt dassies, a dassie krans is a good place to trap at "It's dogged as does it." If Mr. Wright is interested in the destruction of vermin, I shall be glad if he will communicate with me.—Yours, &c.,

A. H. MURRAY,
Gen. Sec. Wild Animals Poisoning Club.

Portlock, Graaff-Reinet, May 16.

The Moon's Influences.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Referring to your correspondent's query in your last issue, with regard to the influence of the moon on plant and animal life, I am not able to give him reliable information on the subject There is apparently however, no warrant for a much more general belief, viz . The moon's influence on the weather, and it seems quite probable, that in the instances your correspondent quotes, at least, the influence is also imaginary. Regarding the former, one of our most prominent British astronomers says that careful comparison between the state of the weather and the phases of the moon, has quite discredited the notion that our satellite and the weather bear any relation to one another.

Cases, unfortunately, are not unknown, in which the moon is accused of assuming very peculiar proportions or even of appearing in duplicate, all which, I presume, we shall admit to be imaginary We shall also be reasonable enough to attribute such a state of affairs to another influence than that of the moon.—Yours, &c.,

K C. W.

Dwaal, June 11.

The Great Dip Controversy.

Mr. Timson's Parthian Shot.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—After so much of Mr W. R Southey's condemnation of imported dips, a condemnation so unreasoning and unreasonable, that it would deny all imported dips entrance into the country, and will not admit there is the smallest spark of goodness in any dip but lime and sulphur—it is refreshing, indeed, to read Mr A Warren's sober statement of facts, and his cool, sound reasoning. I thank him for them

Mr. Southey evidently now realizes the force of what I have urged in previous communications, that the only way to eradicate scab from any country is for the law to make it impossible for any man to farm with scab, for that is what his proposed scheme amounts to. He still includes in it the compulsory use of lime and sulphur, although this was so emphatically rejected by the Farmers' Congress, and, as the correspondence in your columns shews, would be alike rejected by the farmers generally I will add that Australian farmers, if they again had scab as in the days of yore, assuredly would reject lime and sulphur, as a matter of fact, they were always free to use their own remedy, so long as it cured

Mr Southey seems to be one of those men absolutely impervious to the stern logic of facts, and it seems quite hopeless to attempt to convince him by this or other means

In South Africa, more than anywhere else, there is a great diversity of opinion, or prejudice, or inclination, or conviction, or whatever it may be, with regard to the merits of the various dips. Taking count of this, surely the best course for the law to take is to declare to the farmers as Mr. Southey's scheme does—"*You shall not farm with scab*," and to say further, what Mr Southey would not, "*You may choose your own remedy for the disease, but banish it you must* "

When the law says this, and it is enforced, every farmer will very soon find the effective remedy.

By allowing this freedom, you secure the enormous advantage of getting the people more largely with the law We all know the folly of attempting to enforce a law to which the bulk of the people are opposed.

An example of Mr. Southey's method of argument, or warfare, is given in his curtly dismissing as unworthy of credence evidence of wool experts of high and world-wide repute, properly authenticated by names and addresses, that lime and sulphur seriously injures the wool. Yet he calls to witness in his own defence, and asks us to accept the statement of an anonymous writer in an Advertiser, who says Cooper's Dip was used only on small flocks to help eradicate scab from Australia.

The truth is that, except in one Australian colony, Cooper's Dipwas not introduced until after scab had been eradicated. This shews the reliability of Mr. Southey's witnesses! He should test his evidence before bringing it into court!

The exception was Western Australia, the last of the Australian States to adopt and enforce the necessary legislation, and there Cooper's Dip was most largely used.

If Mr. Southey cares to enquire he will find that Australian farmers very quickly abandoned lime and sulphur when Cooper's and other scientifically prepared dips appeared, offering equal certainty of cure and safety, with easy preparation, but without injury to the wool, which by indisputable evidence was officially computed to be seventeen per cent. by lime and sulphur.

Mr. Southey asserts that the farmer's rejection of lime and sulphur at Somerset East was partly due to the influence of imported-dipmen. Does he realize how very serious a reflection he thus makes upon his brother farmers? My own experience of them is that a poor sheep dipman has no chance at all with them, unless he can prove right up to the hilt that he has a downright good bargain to offer them As for Mr Southey's contention that lime and sulphur is no trouble to prepare and use -if he has read the long paragraph in the letter of Mr. B J Burgers, relating what is necessary for the preparation of lime and sulphur, and contrast it with the simple requirements of Cooper's Dip—25 gallons cold water to each packet—and will believe what he can readily prove for himself, that left for a while in water enough to cover it, Cooper's Dip practically mixes itself, he must, if he has any sense of fairness left in him, admit that, compared to the great trouble of lime and sulphur—Cooper's Dip is ease itself

Observe that Mr. Burgers, a lime and sulphur man, says he has often added a few packets of Cooper's Dip (for what other reason than because he had found lime and sulphur defective?) and, found the addition very good

Mr. Southey admits lime and sulphur will not kill ticks and lice, and as for ticks, he says, "neither will Cooper's," quoting again another anonymous writer "C.J V." in evidence

I have not seen C.J V.'s testimony, but I am sending Mr. Southey that of many dependable and independent South African farmers, who assert that it is splendid against ticks.

May I offer to Mr. Veale some words of explanation of his difficulties. He writes very fairly, and emphasises two faults in lime and sulphur which he calls *small.* Surely they cannot be considered small matters to a farmer, (1) to have to take the risk of finding when he comes to dip that the lime is bad, and (2) if, when his lime and sulphur bath is ready, rain comes on and delays his dipping—that the whole of the prepared liquid is gone so bad as to be useless.

Cooper's Dip is always uniform, and will keep good any length of time either in the powder or in the prepared bath.

Mr Veale says, if you make arsenical dips too strong, they kill the sheep, and if too weak they fail to kill the scab

This surely is self-evident, and I am certain that every maker of arsenical dip will agree with him. All dip is made to kill, though some may and others may not!

You can kill an elephant with Cooper's Dip if you wish, and have first caught your elephant. You have only to make the dip strong enough, but for the almost invisible scab insect you won't need it so strong as for the elephant.

To adjust and preserve the proper strength for scab is perfectly easy. *25 gallons of water to one packet of dip* Keep that proportion and the dip must be right.

It is quite true, as Mr Veale says, that Cooper's Dip is not a perfect solution It does not dissolve completely like sugar and salt It could quite easily be made so, but only at the sacrifice of one of its most valuable properties—its protective powers.

For the farmers' sakes and their own, the manufacturers refuse to deprive the farmers of so important a quality just to save them the little work of stirring the bath.

This occasional agitation or stir—best and very easily done with a plunger—keeps the bath perfectly uniform, and ensures every sheep getting its own proper quantity. I may explain to Mr. Veale and to others interested, that the minute particles of Cooper's Dip held in suspension, and not completely dissolved in the bath, do not contain the *curative ingredients* which are as perfectly dissolved as sugar or salt, and go right down to the very root of the disease.

The particles in suspension, or undissolved portion, contain the *protective* properties which remain in the fleece to guard against re-infection—as they do for a considerable time after dipping.

Mr. Veale will realize that if these protective ingredients were as soluble as sugar or salt, they would be as easily dissolved and washed out by the first shower of rain, and their design frustrated.

So it is that the whole of Cooper's Dip is retained—on the skin and in the fleece. The curative ingredients go right down on to the skin, where they are needed, where the disease lies, and where the rain cannot get at them. The protective ingredients are distributed throughout the fleece where they serve as a protection against re-infection, and remain in such a condition that, when once the sheep are dry, rain cannot remove them.

The occasional stirring of the bath is the merest trifle of trouble to ask for such valuable considerations.

With every desire to be as fair as a partisan can be, I am open to allow that it is distinctly preferable to avoid the risk of exposing to cold rainfall sheep saturated with wet dip. This risk is not peculiar to arsenical dips, but is inseparable from all dipping, even if the bath contain nothing but cold water, or only Mr. Southey's lime and sulphur

If Mr Veale can induce Mr. Southey to put on sheep's clothing, take a plunge some evening in his perfectly harmless and beneficial cold lime and sulphur bath, and remain throughout the night in a cold drenching rain, he will get proof to demonstration of the effect.

But I hope he won't, for I like Mr. Southey: he does my cause such excellent service I thank Mr. Veale very much for the opportunity his questionings have afforded me of making these explanations, and I hope they may bring him added satisfaction to that which he is so good as to testify he has found in Cooper's Dip in the past.

Two things are required for success in dipping —I A dip. II. A workman. Each has his own part to perform indispensable to the other The dip must be good: the man must provide proper use, with just ordinary care—nothing very special. Unluckily for the dip it is a dumb tool in the man's hands. The man can talk. The dip is speechless!

When any mishap occurs the man usually does talk, and pretty strongly, of the tool which lies there dumb with none to say a word for it, or to investigate if the man has handled it rightly. And so the dip gets all the blame!

Very rarely indeed does the man turn away from the dip, look at himself, and face the questions—What have I done? Have I handled the thing aright? Did I mix it rightly? Did I put the sheep in when heated from driving or thirsty? or have them driven out to the veld too soon after dipping, etc, etc.

If every man who has a mishap in dipping would so examine himself, he would often find the reason, and ever after avoid accident

To impress care and thoroughness, Mr Southey says, is the duty of the sheep dip vendor

Surely he himself who aspires to guide and direct his fellow farmers, admitting as he does the necessity, is not without responsibility in this direction, especially when he urges, as he has done, that the man's proper performance of his part is an essential element to success even with lime and sulphur

I am sorry indeed, Mr. Editor, to inflict so much upon you and your readers, but it may console you and them to know that I am on the eve of my departure from South Africa to regions far removed from the scene of this controversy, which I must now quit.

I hope I may ask leave to retire "not out," and still to be reckoned a member of the "imported dip" team, ready for another contest whenever occasion calls and permits —Yours, &c.

S Rowland Timson,
General Manager, "Cooper's Dip"

Salisbury, Rhodesia, May 16, 1905

Mr. Southey replies to "First Combing."

The Eradication of Scab from South Africa.

To the Editor, Agricultural Journal.

Sir,—The importance of the above subject must be my excuse for troubling you for space.

I note in the *Cape Times* of the 24th of May, an article by "First Combing" with the heading "South African Wools Lime and Sulphur Dips" This article appears to be based entirely on theory without a vestage of practical experience consequently, it is unreliable and absolutely misleading to sheep farmers who are anxiously seeking for information how best to eradicate scab from their flocks. Taking it for granted that lime and sulphur, like all other dips, is more or less injurious to wool, the first and primary object is to rid the Colony as soon as possible of scab by the safest, surest and most economical method, the injury to wool being a secondary consideration. This being our object we cannot do better than follow in the footsteps of such countries as New Zealand and Australia, who, by the use of lime and sulphur have not only eradicated scab, but placed their wools at the top of the list on all the markets of the world.

The question is put—why do these countries not use lime and sulphur to-day? The answer is—for the simple reason that they have eradicated scab, and are using other dips for killing lice and ticks. "First Combing" tells us that scab is still prevalent in an old country like England, is it surprising when sheep farmers there consider they would only be fit for an asylum were they to use lime and sulphur. As to the statement by "First Combing" that lime and sulphur kills the sheep as well as scab is ridiculous and quite unheard of in this colony. As for the use of imported dips, I have not only suffered serious losses myself while failing to kill the scab, but have heard of numerous cases from others of a similar result. I may mention Mr. R. Pell Edmonds, a well known sheep farmer of Ripplemead, Kabusie, had some of his show stock infected with scab at the Rosebank Show last year After five dippings with imported dips the sheep were not cured Two dippings with lime and sulphur gave him a clean bill. This is only one instance out of many which would take too much of your space to particularise

With your permission, Mr. Editor, I would invite all sheep farmers who have used lime and sulphur as a cure for scab to publish their experiences in your widely read *Journal*.

If, as "First Combing" states, every sheep farmer using lime and sulphur can only be fit for an asylum, the whole of New Zealand and Australia would be one huge asylum. This I think, Mr Editor, is an opportune time to republish at foot of this letter the report on my experiments with lime and sulphur dip, together with the Chief Inspector's (Mr. Allan Davison) remarks.

EXPERIMENTS WITH LIME AND SULPHUR DIP.

Mr W R. Southey, of Varken's Kop, the well-known breeder of Tasmanian sheep, has recently made some interesting experiments with lime and sulphur dip in order to ascertain if the fleece was in any way injured by the effects of the dipping.

Four samples of wool taken from the sheep experimented on were sent to Mr. H. B. Christian of Port Elizabeth, who placed these samples in the hands of two of the best local wool experts, Messrs. John McIlwraith and Thomas Smerdon

The wool, together with the reports of the experts, are at present in my possession, and I have much pleasure in complying with Mr. Southey's request for publication of the latter in the *Agricultural Journal*. I may add that the wool has been taken from Tasmanian sheep, the lustre, elasticity and strength appearing perfect

The thanks of all farmers who desire to see scab eradicated from the country are due to Mr. Southey for his action in this matter.

(Signed) ALLAN G DAVISON,
Chief Inspector of Sheep.

FOUR SAMPLES OF WOOL DIPPED IN LIME AND SULPHUR.

No. 1. Ewes' wool, nine months' growth, dipped in lime and sulphur, two dippings, six weeks' growth, 30 lbs. lime to 50 lbs. of sulphur, the whole of the mixture emptied into tank, but been allowed to settle, and only liquid used

Report of Sample of Wool No. 1.

No. 1. Stated to be ewes of nine months' growth, excellent length for only nine months' growth, quality, lustre, elasticity and strength of staple perfect. A faint trace of dip.

(Signed) JOHN MCILWRAITH.

Port Elizabeth, October 2, 1899.

Report of Sample of Wool No. 1.

No. 1. Said to be nine months' growth, very sound, evenly grown, good character, with lustre combing.

(Signed) THOMAS SMERDON.

Port Elizabeth, October 10, 1899.

No. 2. Twelve months' hoggets dipped in lime and sulphur, five and six months' growth, same mixture as above two dippings.

No. 2. Twelve months' hoggets or lambs, beautiful quality, quite equal to Australian length; lustre, elasticity and strength of staple perfect. Has all the qualities for producing a superior quality Bradford top, faint trace of dip.

(Signed) JOHN McILWRAITH.

Port Elizabeth, October 2, 1899.

No. 2. Hoggets, very sound with quality, superior lustre, full combing.

(Signed) THOMAS SMERDON.

Port Elizabeth, October 10, 1899.

No. 3. Hamels' wool dipped in lime and sulphur, four months' growth, two dippings, five pounds lime to twenty pounds sulphur, dip allowed to settle and only liquid used.

No. 3 Hamels, very deep grown, grand combing wool, not extra fine quality, beautiful lustre, sound staple, faint trace of dip.

(Signed) JOHN McILWRAITH.

Port Elizabeth, October 2, 1899

No 3 Hamels, very sound, beautifully grown, superior twelve months, combing with lustre.

(Signed) THOMAS SMERDON.

Port Elizabeth, October 10, 1899.

No 4 Ewes' wool, nine months' growth from ewes rearing lambs, twelve years old, running on lucerne, dipped

No 4 Stated to be twelve year old ewes of nine months' growth, splendid length for nine months' growth, beautiful quality, lustre, elasticity and sound in staple but rather yolky, sheep evidently too well fed, no trace of dip.

(Signed) JOHN McILWRAITH

Port Elizabeth, October 2, 1899.

No 4 Ewes, very fine quality, wonderfully sound considering its being shorn from sheep said to be twelve years old with five months' lambs at breast.

(Signed) THOMAS SMERDON.

Port Elizabeth, October 10, 1899.

The farmer owning the sheep which produced these samples has every reason to be proud of his flock, and if we had the farms stocked with flocks of similar strain Cape wools would rank higher than they do to-day.

The trace of dip in samples 1-3 is so faint that it is difficult to say what dip it is, smells like lime and sulphur, but there has been no injury done either to the fleece or colour of the wool by the dip. We should say that the wool of No. 2 sample was longer grown when the sheep were dipped than that of Nos 1 and 3.

(Signed) JOHN McILWRAITH.

Port Elizabeth, October 2, 1899.

All the above shew that the greatest care must have been taken with the flock represented, and the grower may really be proud in possessing such excellent stock.

It is said that samples 1-3 have been dipped. It is, however hardly possible to trace it, but, if such be the case, the result of such dipping, judging from their excellent lustre, soundness of staple, and general appearance, must surely prove the efficacy of such dip It is also said that the stock represented by sample No. 4 has been grazed on lucerne, which fact speaks very highly for the suitableness of this article of food for sheep

(Signed) THOMAS SMERDON

Port Elizabeth, October 10, 1899.

In conclusion, Mr Editor, I may mention that this valuable flock of sheep is now owned by my son, F W. Southey of Hillmoor, Steynsburg, who, like myself, is a practical sheep farmer and a firm believer in lime and sulphur for the eradication of scab, and has had a clean bill for the last seven or eight years, from which time he commenced to use lime and sulphur, having previously failed with imported dips. He was among the principal prize winners for both sheep and wool at the last Grahamstown and Port Elizabeth shows taking no less than 3 Champions, 1 first, 4 second and 3 third prizes for wool and sheep This enterprising sheep farmer is now enclosing and sub-dividing his farm—10,000 acres—with jackal-proof wire-netting, this large expenditure coming out of profits made out of wool and sheep dipped in lime and sulphur.

For the information of "First Combing," this young farmer is not yet fit for the asylum.—Yours, &c.

W. H. SOUTHEY.

Varken's Kop, May 30.

Lime and Sulphur *versus* "Hayward's Paste."

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Mr. Southey "nails lime and sulphur to his mast," but, curiously, instead of standing by it, he goes "to fetch a policeman." If scab is to be eradicated from this country, it will only be by good up-to-date dips and the hearty co-operation of farmers, and this will not be obtained if stock-owners are forced to use lime and sulphur, which they detest: the less policemen and other inexperienced persons are allowed to interfere the better

In our former letter we took exception to Mr. Southey placing a handicap on Hayward's "Sulphur Paste," but we have no desire to stop his campaign against proprietary dips PROVIDED THEY ARE DEFECTIVE. The proprietors of "Hayward's Paste" never denied that lime and sulphur, properly prepared, will *cure scab*, but the primary desire of sheep farmers is to *grow good long staple wool*, which can be grown to to perfection with a dip containing the ingredients in the "Sulphur Paste"

Mr. Henry Veale should take an equal proportion of, say, lime and sulphur, an ordinary powder dip, and then "Hayward's Paste," and, after mixing them, leave them for a couple of hours: on re-examination he will then find that, whereas the "Sulphur Paste" is still in solution, the other dips will have deposited and formed a sediment. Practical farmers will recognise the significance of this. The experience of Mr. B. J. Burgers, of Palmietfontein, is different from that of, say, Mr Lee, of Klipplaat (whose name is so well known in connection with the Stud Book), who never dips woolled sheep or goats in anything but "Hayward's Paste," and, besides, the cost of the sulphur alone as used by Mr Burgers is as expensive as Hayward's without counting lime, fuel, labour, etc

But what is the use of mere argument, Mr Editor? Let us have a practical test of, say, Lime and Sulphur, one Powder Dip, one Nicotine Dip, one Carbolic Dip, and Hayward's "Sulphur Paste," on conditions to be arranged by you. *Experimentia omnia docet*—Yours, &c,

HAYWARD, YOUNG & Co,
General Agents for Hayward's Dips.

Port Elizabeth, May 16.

Yet Another Version.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Bearing upon the subject of the eradication of scab, and more particularly upon the use of lime and sulphur, may I draw your attention to the following extract from *The Chemist and Druggist*, February 18, 1905.—

"SHEEP DIPS FOR SCAB.

"The formulæ recommended by the Board of Agriculture (see *C. and D*, February 4, p. 204) do not seem to be giving universal satisfaction. One well-known authority, writing to us on the subject, says —

"'With the usual perversity of a Government Department, the only remedies they have actually mentioned in their Order are three, everyone of which is universally recognised by authorities either as injurious to the sheep, or to the wool, or inefficient for scab-curing.

"'1. *Lime and Sulphur* This has brought more ruin to the wool in the countries using it than sheep-scab itself and all agencies put together. The Bradford Chamber of Commerce, in response to the direct request of the Agent-General for Cape Colony, passed a resolution on this subject in the following terms.

"'"In reference to a letter from the Agent-General for the Cape of Good Hope, asking for the opinion of the Chamber as to whether a lime and sulphur sheep-dip was injurious to Cape wool, the President stated the Wool Supply Committee had replied that such a dip was very detrimental to the wool."

"'2. *Carbolic Dips.* These, though good insecticides, have no protective properties whatever, and it is protection that the sheep principally want. Where scab exists the eggs and insects are scattered about over the pasture, and, unless a protective dip is used, a cure is no sooner effected than a new outbreak occurs through contamination with these eggs and insects.

"'3. *Tobacco Dips.* These are of uncertain strength, stain the wool, throw the sheep off their feed, and are guilty of a hundred other iniquities. This is just the reason why, even in countries where tobacco is grown on the farm, sheep men have abandoned it in favour of more reliable and less deleterious remedies'

"Our correspondent's criticism does not accord with the conclusions of the Departmental Committee, who reported on this subject last August, except in regard to tobacco, which under no conditions makes a first-class dip. We understand that one of the aims of the Department was to supply formulæ for dips whose ingredients are not difficult to get as not being hedged round by poison restrictions. The experiment now being made is one of exceptional interest, and, as the Order applies solely to 1905, it will be interesting to see what its outcome will be."

In further support of the statement that lime and sulphur does injure the wool, I beg to state that Mr. James Lamb, of Port Elisabeth, having carefully examined a sheep that had been very badly infected with scab, and was dipped in Fletcher's Albany Tick and Scab Dip, states: "I saw the sheep some time after it had been dipped with Fletcher's Albany Dip, and found it perfectly free from scab. The new growth of wool on the sheep was soft and healthy, and my opinion is that this dip increases the growth and improves the condition of the wool."

On Mr. Lamb's recommendation, and on the advice of expert sheep farmers, we arranged to send a fleece Home for report, as, in the opinion of good judges, the wool seemed to be improved rather than being injured by this dip The following is the reply received.—

"[COPY]

"March 30, 1905

"Dear Sir,—With reference to the matter brought before you by Mr
beg to report that it is impossible for us to judge from the bag of loose wool submitted, whether the dip used is detrimental to the dyeing and finishing or not, because we have no means of comparing this wool with *undipped* wool from the same sheep

"One way of settling the question would be that the sheep farmer be requested to communicate to us the exact recipe and strength of the dip used, and, *if possible, a sample* of the chemicals he uses.

"*As to the dip in sulphur and lime, we can say* that this is certainly *very injurious* to the wool, and SHOULD BE STRICTLY avoided.

"Yours faithfully,

"The Bradford Dyers' Association.
"(Signed) P KRAIS, Chemist

"To H SUTCLIFFE, Esq, Chairman,
"Bradford Dyers' Association, Ltd., Bradford"

This is no uncertain condemnation of the use of lime and sulphur

I may add that we are submitting samples of dipped and undipped wool to the Dyers' Association for experiment, as we are firmly convinced that in Fletcher's Dip we have a cure for both scab and tick without detriment to the wool of sheep or the hair of Angora goats, and with decided benefits to the animal dipped, be it sheep, goat, or ox.—Yours, &c,

G D. ATHERSTONE, Manager.

A Correction.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I notice in your report of the Grahamstown Show you have given G. King & Sons the credit of having taken champion ram in the fine-woolled class. I would be glad if you would correct the error in next issue. It should have been J H. King.

In Port Elizabeth fine-woolled class I am credited with third prize for imported ram. I could not have taken it, as I had no imported fine-woolled ram there.—Yours, &c.,

J. H. KING.

Tarkastad, May 21st

We regret the mistake. It arose in copying the prizes from the official list.

Wanted: Fox Terriers.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Could you or any of your correspondents kindly inform me where I can obtain well-trained fox terriers for jackal killing, and also well-trained fox hounds, and at what prices per pair.

Thanking you in anticipation.—Yours, &c.,

JACKAL DESTROYER.

Steynsburg, C C., May 20.

Dr. Purvis's Heartwater Vaccine.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In a note concerning my vaccine you state in the May issue of your *Journal* that my heartwater experiment "is indecisive," because there were ten controls, among which the death-rate was forty per cent.; but you do not mention in your note that there were forty inoculated sheep, among which the death-rate was only ten per cent.; thus, although there was one control to every four inoculated animals, yet both the liability to heartwater and the death-rate were much higher among the controls than among the inoculated.

You have not noted the fact that the first inoculated sheep died from heartwater nearly seven months after inoculation, and the other three succumbed more than a year after inoculation. The experiment was *very decisive* in one respect not mentioned in Mr. Spreull's report, and that was that Mr. Slater's percentage loss among his Boer kids was greater than among the Merino sheep inoculated by me.

The experiment on a larger scale by some farmers which you suggest has been carried out already in Central Albany, where over two thousand sheep have been successfully inoculated

Finally I may state that at least three Farmers' Associations have expressed their confidence in the "efficacy" of my method, as the resolutions sent by them to the Agricultural Department will prove Yours, &c.,

GEO. CARRINGTON PURVIS.

Grahamstown,
May 16th, 1905.

P.S.—It was unfortunate that the first farm, near Middleton, on which the sheep were placed, was not more virulent, as the inoculated animals kept gradually losing their immunity or protection during the time (nearly nine months) they remained on this farm.

RURAL REPORTS.

For the month ending 15th June, 1905.

Aberdeen.—The rainfall during past month has been better than last year. Weather is cold and windy, and veld in fairly good condition. Owing to the seasonable rains we have had, more grain has been sown this season than for the last four years. The water supply is still, however, somewhat uncertain. Livestock of all descriptions is in fairly good condition, with the usual scarcity of slaughter animals. There is a fair demand for good horses. Sheep are now commencing to lamb. Kidding is expected to be late.

Bedford.—Weather has been droughty here until end of May, when nice showers began to fall. The Karroo is now showing a green tinge, but the grass is still very short. Cattle in extremely poor condition, thousands have left this district for Bechuanaland and O.R.C. in search of grass. Sheep in good condition so far, and lambing has been excellent. Sheep manage to graze and thrive on the short green grass, which is too short for cattle. Goats are not in quite as good order as sheep, but still doing fairly well. Ostriches are also in fairly good order, and breeding season just commencing.

Herbert.—There have been slight showers on the Locations during the month, but they have come too late to do any good to the pasturage. The weather has been extremely cold, and the heavy frosts have burnt up the grass left by the large swarms of locusts, which are practically denuding this district of all its pasturage. Many farmers have been obliged to remove their stock, and seek grazing elsewhere for their stock. The natives are, however, killing wagon loads of locusts, and using them for food.

Oudtshoorn.—The weather has varied very much in this district during the past month. Some wards report fine and moderate weather. Others state that it has been bitterly cold and stormy, the Swartberg range remaining covered with snow, and there have been severe frosts on the cessation of the wind. There has been practically no rains so far, and veld is mostly very dry and in poor condition. One ward reports good crops of wheat, oats, mealies and other grain, but other parts report few or no crops. No fruit at present. Cattle on the whole in fair condition. One or two cases of lung sickness and red-water reported. All live stock are, on the whole, doing well considering the adverse conditions which have prevailed for some considerable time past. Horses, both for riding and draught purposes, are selling at very fair prices, and markets are reported firm. Ostriches are suffering most from effects of the drought, cold, and want of proper food, many having succumbed already. Plucking, on the whole, not promising.

Queenstown.—Weather is cold and windy. Snow on mountains. Rainfall is above average, but only took place on last four days of the month. Veld is in bad condition. Cattle in poor condition. Horses doing fairly. Sheep in good condition in spite of drought. On the whole the winter prospect is exceedingly gloomy.

Riversdale.—So far the rainfall has continued light. Weather cold. Veld in good condition. Wheat has just been sown. Mealies and other grain are yielding good crops. Chief variety of fruit at present is oranges. There are no diseases or insect pests. Live-stock of all descriptions are in good condition with the exception of goats, which are indifferent.

Robertson.—This district has been visited with seasonable rains of late, and veld should soon begin to pick up. Weather at present rather cold. Mealie crop very small. Lucerne growing slowly. Vines (Cape) in good condition. Cattle doing well. No diseases. Horses in good condition. Prices somewhat lower. Goats (Cape) doing very well. Ostriches on the whole in good condition. Pigs thriving.

Van Rhynsdorp.—The rainfall for the past month has been exceptionally heavy for this place, and the best since 1888, registering 2·29 inches, and weather still promising. The weather has been cold, and stock of all descriptions, owing to their poverty, have suffered very much. A great many sheep and goats have slipped their lambs, and altogether it is estimated that quite 60 per cent have died. Slaughter stock are scarce and dear. The veld is improving, and, in spite of the mortality among the small stock, the farmers are hopeful and anticipate a good season generally.

TRANSKEI.

For the month ending 31st May, 1905.

Bizana.—As I write heavy cold rain is falling, accompanied by a strong south-east wind This is welcomed, and will do a great deal of good Natives are now gathering in the crops, which, I regret to say, are not so good as predicted The veld in part is bad, but nevertheless stock of all kinds is in good condition. Horse sickness has disappeared entirely, and regret I have no means of stating the losses. At the same time this disease only affected that part bordering the Flagstaff District. No other diseases have been reported during the month.

Flagstaff—I have nothing of interest to add to my last report. The weather has been uniformly good and warm, with the exception of a few wet days, which were accompanied with cold winds. The pasturage is very good for the time of year. Stock in fair condition and free from disease.

Kentani.—Reaping is now proceeding throughout the district. Mealies and Kafir-corn crops are below the average; there seems, however, to be an abundance of beans Heavy winter rains are now falling Stock are in good condition, and the pasturage cannot be better for this time of the year.

Lusikisiki—Rainfall this month has been heavier than the preceding one, it was especially heavy on 31st May. Sky is cloudy, and more rain threatening Veld in good condition. Fair crops of Mealies and Kaffir-corn are expected Slaughter cattle in good condition. Horse-sickness appears to be dying out Sheep and goats are in fair condition A cold rain has killed off a large number.

Maclear.—Warm weather prevailed during the early part of the month, but towards the end of the month cold weather set in, accompanied by high winds and a soaking rain and sleet. A fair amount of snow also fell in some parts of the district Large as well as small stock are in good condition and health. The pasturage is still in fairly good condition

Matatiele.—The wild Autumn was broken in the early part of the month by a fall of snow, followed by cold and frosty nights, this led again to a milder period. Towards the close of the month cold weather again set in, and on the last day there was a heavy snowfall, preceded and followed by rain, which covered the whole country to the extent of about a foot The rain gauge registered during that period nearly 2¼ inches, and no doubt the veld will improve. Growing wheat crops will be much benefited Losses of stock, but not of a very serious nature, are reported from various parts of the district Redwater which existed in a virulent form has abated, and will no doubt die out with the advent of severe frosts now prevalent. The grain crops are being harvested, and mealies will be a little below the average, but Kafir corn will be scarce. The Agricultural Show was successfully held during the month.

Mount Ayliff.—On 31st May and following night we experienced an almost phenomenally heavy fall of rain—nearly *four* inches falling in 20 hours. The weather has been cold towards the end of the month. Mountains capped with snow. The veld is in exceptionally good condition for the time of year, owing to late rains. A very poor crop of mealies and Kafir corn is expected. Cattle are looking well for the time of year. Several outbreaks of lung-sickness have been successfully dealt with by means of inoculation and the observance of a strict quarantine. Horses are looking well, and are free from the diseases which have created such havoc nearer the coast. Sheep and goats in fair condition. Slaughter stock as usual somewhat scarce.

Mount Currie.—Since the date of my last report severe frosts have been experienced, and the Mealie and Kafir corn crops have suffered in consequence. There was a slight snowfall on the 3rd, and heavy rain and snow on the 31st, the gauge registering over three inches. It is feared there has been a great loss of stock during the last day or two owing to the weather, which has been almost as bad as that of the month of June, 1902. Stock generally is in good condition. No disease was reported. The pasturage is poor.

Mount Frere.—The early frosts have considerably damaged the Kafir corn and Mealie crops, which are not as good as was expected. On the 31st May a very heavy rain, with high winds, swept over the district, and has blown down the standing crops, destroying a good deal. The veld and stock are in excellent condition to begin the winter, and the rain above referred to will keep the former good until the spring. There have been no fresh outbreaks of disease reported, and as far as I can gather the district is free of lung-sickness.

Ngqeleni.—Fair weather prevailed during the early part of May, but during the last week heavy rains fell, accompanied by wind and severe cold, which, unfortunately, did very little harm to the stock. No infectious animal diseases have been reported, and stock, both large and small, are still in fair condition. There is every prospect of good pasturage during the winter, owing to the late rains. Mealies are being brought in and sold by the natives.

Nqamakwe.—Very cold weather was experienced during the first week of this month, with heavy frosts, throughout the district, and these have done much harm to the Native crops, which were in a very backward state owing to the lateness of last ploughing season. A heavy rain has prevailed since the 30th inst., and, as it was accompanied by cold, considerable losses in stock will probably result.

Port St. John's.—Veld in good condition. Over four inches of rain have fallen. Rivers all flooded. Weather has been very wet during the past week. Posts disorganised. The mealie crops can be described as good, exceptionally heavy in parts. There are plenty of bananas, oranges, and naartjes at present. Cattle in fair average condition. Horse-sickness has not yet disappeared. One animal died on the 29th May. Practically all the horses have now been swept off.

Tabankulu.—On the last day of May a heavy rain fell, which seems likely to continue, and be followed by cold weather, thus retarding the reaping of the crops. Of both mealies and Kafir corn there will be a yield rather below the medium due to early frosts. The outbreak of redwater is dying out, cattle generally being in good condition.

Umtata.—There is nothing of note to report for the past month. The crops of grain are not yet fit for harvesting. No diseases amongst cattle or horses have been reported, and small stock are doing well.

Willowvale.—The general condition of stock is fair. Prices of cattle have decreased somewhat, averaging between £8 and £10. Cases of quarter-evil were reported. Small stock are fair. The crops have been very poor. Only one-third of average crop will be reaped. Fruit has not been a success. The weather has been warm and dry until the latter part of the month, when cold set in, and, as I am writing, heavy cold wind is blowing accompanied by cold rain.

NOTES ON THE WEATHER OF MAY, 1905.

By Charles M Stewart, B Sc , Secretary to the Meteorological Commission.

A depth of rainfall about one quarter greater than usual, few thunderstorms, cool cloudy weather with daily local fogs, some sharp frosts, with snow at the beginning and end of the month, were the leading features of the weather of May last

Precipitation —The mean rainfall, based on an average of 343 stations, amounted to 2 34 in , falling on six days, this average shows an excess over the normal of 0 53 in , or 29 per cent This unusually abundant precipitation was experienced over the greater part of the Colony, but affected most largely the division of Kaffraria, where the rainfall was about 4½ times the usual amount, over the other sections similarly affected, the excess varied from 96 per cent. in the South East to 28 per cent on the South Coast. Deficient rainfall was mainly confined to the Southern and Central Karoo, Basutoland the Orange River Colony, and apparently Rhodesia and Natal. The deficit varied from 65 per cent over the West Central Karoo to only 6 per cent. in the East Central Karoo It is evident, however, that the rainfall has been only partial even over some of the divisions showing a plus amount in the above table, as the report from Thibet Park, in the Queenstown Division, states, " Fearfully dry, and water in rivers and springs has failed; never been known to be so dry at this time of year." The rains during the month mostly fell in cold showers, in some places assuming the form of hail, sleet, or snow. Opinion among the observers varies as to the advantage or disadvantage of rainfall at this season over the various districts. Thus, Mr. Halse, of Carnarvon Farm, expresses the opinion that " the rainfall at the end of the month will not help the grass, as we shall have severe frosts every clear night for the next three months." On the other hand, our observer at Boschfontein (Div. Hanover) considers the " rain and snow at the end of the month calculated to do immense good, as every drop went into the ground." These differences of opinion,

Division.	Mean Rainfall (1905)	Mean No of Days	Average Rainfall (1894 1903)	Average No of Days	Actual Differences from Averages	Percentage Differences from Averages
	Ins		Ins		Ins.	Percentage
Cape Peninsula	7 70	16	5 09	10	+ 2 61	+ 51
South-West	4 24	10	3 06	7	,, 1 18	,, 39
West Coast	2 07	8	1 49	5	,, 2 07	,, 39
South Coast	2 39	8	1 87	6	,, 0 52	,, 28
Southern Karroo	91	4	1 00	4	– 0 09	– 9
West Central Karroo	25	2	0 71	3	,, 0 46	,, 65
East Central Karroo	66	3	0 70	3	,, 0 04	,, 6
Northern Karroo	1 10	3	0 68	3	+ 0 42	+ 62
Northern Border	68	3	0·51	2	,, 0 17	,, 33
South-East	2 24	5	1 14	1	,, 1 10	,, 96
North-East	1 44	5	0·85	3	,, 0 59	,, 69
Kaffraria .	3 38	1	0 77	3	,, 2 61	,, 339
Basutoland	1 14	4	1·38	4	- 0 24	– 17
Orange River Colony	·80	4	1 04	3	,, 0 24	,, 23
Durban (Natal)	81	5	1 79	4	,, 0 98	,, 55
Bechuanaland	22	2	0 47	1	,, 0 25	,, 53
Rhodesia ..	02	1	0 45	1	- 0·43	– 96

however, do not apply to the coast belts, which are practically devoid of frost, and where the light, steady rains of the last week of the month have done much good to the young crops, and ploughing operations are being carried on vigorously. The widespread distribution of the rainfall during May is shown by the following analysis of the monthly totals Of the 343 stations, only 3 had *nil*, 93 had 1 in. or less; 110 had between 1 and 2 ins., 56 between 2 and 3 ins ; 29 had from 3-4 ins.; 20 had from 4-5 ins.; 10 had from 5-6 ins., 8, from 6-7 ins ; 4, from 7-8 ins ; while 10 had over 8 ins.—the maximum being 14·55 ins. at Waai Kopje (Table Mountain)—St Michael's, also on Table Mountain, coming next with 13·38 ins, while Newlands (Montebello) was third with 11·23 ins. The comparatively light nature of the daily amounts registered is shown by the fact that, out of 339 stations furnishing details, and excluding the three with no rainfall, 205 had 1 inch or under, while 101 had between 1 and 2 inches: 21 had from 2-3, and only 9 more than 3 inches The only two maxima exceeding 4 inches in 24 hours were 4·50 inches, registered at Umzimkulu on the 31st, and 4·07 inches at Tabankulu on the same date.

Thunderstorms were reported from, altogether, 25 stations on the first two days and the last five days of the month, but chiefly on the 1st, 2nd, 27th and 31st A hut in the village of Umzimkulu was struck by lightning and burned on the 27th. *Hail* fell at 14 stations on 8 days, chiefly the 26th, 27th and 31st *Sleet* occurred at 32 stations on 7 days of the month, chiefly the 30th and 31st Precipitation assumed the form of *Snow* at 71 places on 9 days, 1st—3rd, 26th—31st, but most widely on the last 2 days of the month

Temperature, Cloud and Wind.—The marked contrast between the weather of May and of the previous month as well shown by the mean temperature of all the stations (56·8°) which is 1·2° less than the average and 8·2° colder than during April. The maximum temperature reached an average of only 68·1° or 2·3° less than usual, while the mean minimum temperature was 45·6°, the same as the normal—a mean daily range of 22·5° Generally speaking the mean temperature was below the average at most stations by 1 to 2 degrees, but was rather higher than usual at a few stations in the interior of the Colony The extremes were a deficit of *minus* 3·6° at O'okiep and an excess of *plus* 1·6° at Kimberley. The mean maximum was generally below all along the coasts and for some distance inland by 1 or 2 degrees, but was above the normal at some of the more inland stations such as Wagenaar's Kraal *plus* 2·3°) and Kimberley (*plus* 4·5°), while the mean maximum temperature was lower than usual by 1 to 3 degrees in the West, South and North, but slightly warmer than the average in the eastern divisions by about half a degree The mean daily range varied from 9·8° at Cape L'Agulhas to 33·7° at Kenhardt. The mean warmest station was Port St John's with a monthly temperature of 64·0°, and the mean coldest station, Rietfontein (Div. Aliwal North) with 49·6°, a difference of 14·4°. The highest mean maximum was 74·7° at Kenhardt and Hope Fountain (Rhodesia), while the lowest mean minimum of 36·3° is found at Rietfontein. The warmest days were most generally the 1st, 5th and 10th, and the coldest mornings usually those of the 3rd—6th, 22nd and 26th—28th. The mean of the absolute maxima was 81·5° and of the absolute minima 37·8°, a mean monthly range of 43·7° or 4·7° less than during April, when the corresponding values were 93·0° and 44·6°.

The highest temperature recorded was 95·0° on the 1st at King William's Town, and the lowest 25·0° at Hopetown on the 28th—an extreme range for the month of 70° over all stations *Frosts*—some of considerable severity were observed at 42 places on 22 days of the month, and most widely from 3rd to the 5th Those on the 4th and 5th severely damaged the mealie crops at Bolotwa, and killed all the tender crops in many places, while the mealie crops at Kokstad also suffered

The defective day temperature may be ascribed to the clouded state of the skies during the month, the average proportion obscured being 46 per cent and ranging from 69 per cent in Cape Town to 11 per cent at Hope Fountain It was cloudiest all along the South Coast between the Cape Peninsula and East London, where the mean daily percentage was usually between 60 and 69; it decreased to 55 per cent. at Port St John's Inland it was mostly about 40 per cent., increasing to 54 per cent. at Kimberley and decreasing to 24 per cent. at Kenhardt and 11 per cent. at Hope Fountain *Fogs* or *Mists* were reported daily from altogether 97 stations. These were generally local in character, but were most numerously reported on the 1st, 2nd, 15th, 23rd and 30th

One of the most notable features of the weather was the marked absence of wind during the month all over the country. If we omit the calms, the prevailing wind-direction was between N W. and W., which blew with the force of a gale on five days. The average wind-force was 1·82, corresponding to a mean velocity of 12·1 miles per hour. Some instances of hot winds were noted during the month.

OBSERVERS' NOTES, MAY, 1905.

Tankatara.—The rain falling in such small quantities has done little good The prospects for the end of the winter are very bad, and heavy losses in ostriches expected.

Boschfontein.—Winds mainly N.W. First frost of season occurred on 2nd; frequent light frosts afterwards Rain and snow at end of month calculated to do immense good, as every drop went into ground. A few swarms of flying locusts about, but did little or no damage.

Van Wyk's Vlei—Winter fairly set in. Veld gone off in condition very much; cold snap has set in, ploughing proceeding

Alexandria – Early crops are fine; no prevalent diseases.

Fort Fordyce.—Anthrax affecting cattle on farms—Mount Pleasant, Woodstock and Allmansfontein.

Bolotwa.—Main crops badly damaged, and all tender crops killed in most places by frosts on 4th and 5th.

Carnarvon Farm.—Comparatively few frosts, the first, on the 4th (8°), did a great amount of damage to late crops; mealies, pumpkins, barley and wheat in ear were all destroyed, and had to be cut as green forage. Owing to the drought up to end of 1904, and this severe frost, there are no mealie crops this season in this district. Of the nine frosts for this month only two were severe, viz, those on the 4th and 22nd Only one cloudless day; five windy days, which is very small for May. The rainfall at end of the month will not help the grass, as we shall have severe frosts every clear night for the next three months.

Sterkspruit.—The crops, although not such a failure as last year, are certainly not very promising on the whole.

Thibet Park—Fearfully dry, and water in rivers and springs has failed; never been known to be so dry at this time of year.

Kokstad—Country covered with snow at end of month; feared heavy loss of stock through bitter cold winds. If cold weather continues, postal traffic will be delayed throughout the district. Rivers bank high. Every appearance of cold snap continuing.

Umzimkulu—Hut in village struck by lightning on 27th and burnt

Groot Drakenstein—Mean temperature of month 2·3° below average of six years, and 11° below last month. Rainfall about the average last ten years.

Potberg.—The quiet steady rains from the 23rd have done much good to young crops, and ploughing is going on vigorously.

Rust en Vrede.—The month has been cloudy and dull, with slight frosts and heavy dews, with occasional hot dry winds. Rain has fallen mostly in fine showers, cold, and accompanied by hail. The Zwartberg has been covered the greater part in clouds and mists, and snowstorms have been prevalent there. Locusts have been passing over to the N E. from the N N W from the 1st to the 15th, since which date it seems to have been too cold for them.

Kokstad (The Willows).—Calm weather and light winds most of the month, but on the 2nd we had a severe gale, with rain and sleet; snow also fell in the district. On the 30th, after several days of great barometrical pressure, gale set in with heavy rain and sleet, and still continues—3·39 inches having been registered from the night of the 30th to the morning of 1st June. Occasional glimpses of hills on 1st June shows snow to their bases. Veld was becoming dried up owing to the frosts early in the month, the mealie crop has also suffered Stock continues in good condition. A few fresh cases of enteric in town—none fatal.

Hope Fountain—The rains were not very favourable for the early ripening of the crops, and the heavy frost on the 4th scorched all the unripe Kafir corn and mealies, and the harvest will be poor.

TEMPERATURE, MAY, 1905.

Stations.	Mean Max	Mean Min	Monthly Mean	Abs. Max.	Date.	Abs Min	Date.
Royal Observatory ..	65·7	49·7	57 7	79·6	5	41·1	22
Simon's Town	67·9	53 8	60 8	75 3	10	45·7	27
S.A. College	66 3	49·9	58·1	81 0	5 & 10	44·0	27
Groot Constantia ..	65 5	50·0	57 7	80·0	5	43·0	26
Sea Point	64·4	51 5	58 0	80 1	6	47·0	27 & 28
Wynberg	67·6	48·3	58 0	83·0	10	43·0	27
Wellington	65 4	47·7	56 6	75 1	10	43·0	22
Groot Drakenstein ..	67·0	46·1	56·6	81 6	10	41 6	12
Elsenburg (Agri. College) ..	65 7	46 0	55 8	73 8	24	40 2	9
Ceres	61·5	39 9	50 7	70 0	9, 17, 18 & 25	34·0	13
O'okiep	69·5	45·2	57·4	84 2	11	36 0	28
Hopefield	70·1	44·9	57·5	84·0	5	40·0	3, 9 & 28
Clanwilliam	73 5	44·1	58·8	88 0	12	38·0	25
Storms River	67·4	47·3	57·4	81 0	6	38 0	4
Concordia (Plantation) ..	62·6	51 0	56·8	77 2	11	44·0	27
Cape St. Francis ..	64·9	52·1	58 5	74·0	5	45·0	4 & 5
George (Plantation) ..	65 7	49·1	57 4	79 5	5	43·5	4
Heidelberg	66 5	44 5	55 5	79·0	6	39·0	6
Cape L'Agulhas ..	63 9	54 1	59·0	70 0	5	45·0	27
Port Elizabeth ..	67 7	52 4	60 0	79 0	25	47·0	5 & 28
Amalienstein	70 2	40 9	55 5	85 0	1	36·0	5 & 22
Murraysburg	66 8	36·4	51 6	81 0	1	31 0	3 & 13
Wagenaar's Kraal ..	66 8	38 9	52 8	80 0	1	31 0	3
Hope Town	70·7	39·4	55·0	84 8	1	25·0	28
Kimberley	73·1	41·7	57 4	88 2	1	27 2	28
Kenhardt	74·7	41 0	57·8	88·0	1	32·0	28
King William's Town ..	73·7	46 6	60 1	95·0	1	35·0	28
East London	69 6	52·4	61·0	84 0	7	44 0	29
Stutterheim	67 1	46·9	57 0	85 0	1	37·0	4
Sydney's Hope	68·6	48·6	58 6	91·0	1	35 0	30
Grahamstown	70 4	44·1	57 2	91 9	1	35 8	29
Aliwal North ..	67·8	36·4	52 1	79 5	1	28·0	28
Queenstown ..	69·1	39·4	54·2	84 0	1	30·0	4
Rietfontein (Aliwal North) .	63·0	36·3	49 6	75 0	1	26·8	4
Main	69·0	46 1	57·6	89·1	23	36·0	4
Port St. John's	72·9	55·1	64 0	88 0	27	44 0	28
Kokstad (The Willows) ..	67 4	38·0	52 7	80 0	1	29 0	29
Matatiele	69 2	39·1	54 2	79·0	1	34 0	28
Umtata	72·3	43·0	57·6	88·0	1	30 0	29
Hope Fountain ..	74·7	46 5	60·6	82·6	2	38·7	4
Means	68·1	45·6	56 8	81·5	..	37·8	..
Extremes	..	..	..	95·0	1	25·0	28

RAINFALL, MAY, 1905.

I. CAPE PENINSULA:

	INCHES
Royal Observatory, (*a*) 12 inch gauge	4·53
Cape Town, Fire Station	5·12
Do South African College	5 89
Do **Sea Point (Hall)**	3 82
Do do. (Attridge)	4·09
Do Molteno Reservoir	6·59
Do Platteklip	8 36
Do Signal Hill	4 11
Table Mountain, Disa Head	7·10
Do Kasteel's Poort	9 62
Do Waai Kopje	14 55
Do St. Michael's	13 58
Newlands (Montebello)	11 23
Bishopscourt	9 39
Kenilworth	7 37
Wynberg (St. Mary's)	9·05
Groot Constantia	7 75
Tokai	6 97
Simon's Town (Wood)	8·74
Do. (Gaol)	9 31
Robben Island	3 54
Camp's Bay	3 90
Fish Hoek	6 47
Cape Point	2 54
Woodstock	5·25
Plumstead	5 55

II. SOUTH-WEST.

	INCHES
Eerste River	4·13
Klapmuts	4·84
Stellenbosch (Gaol)	2·57
Somerset West	5 31
Paarl	6·24
Wellington (Gaol)	7·50
Groot Drakenstein	5·69
Tulbagh	2·84
Kluitjes Kraal	4·74
Ceres	9 28
Caledon	0 55
Worcester (Gaol)	2·13
Hex River	1·85
Lady Grey (Div. **Robertson**)	1 37
Robertson	1 37
De Hoop (Div. Robertson)	1·80
Porterville Road	4 02
The Oaks	4 07
Danger Point	6 47
Elsenburg Agricultural College	4·36
Roskeen	5·46

III. WEST COAST:

	INCHES
Klipfontein	3 18
Kraaifontein	2·30
O'okiep	2 27
Springbokfontein (Gaol)	2 42
Concordia	1·83
Garies	1·66
Kersefontein	1·39
The Towers	3·25
Dassen Island	1·55
Malmesbury	3·72
Piquetberg	3·26
Van Rhynsdorp	1·14
Clanwilliam (Gaol)	0·74
Do (Downes)	0·86
Welbedacht	1·02
Hopefield	1·08
Lilyfontein	4·48
Anenous	2·19
Zoutpan	2·50
Wupperthal	0·89

IV. SOUTH COAST:

	INCHES
Cape L'Agulhas	2.99
Swellendam	4 43
Heidelberg	1·44
Riversdale	0·92
Mossel Bay	2·67
George	2·45
Ezelzagt	1·45
Millwood	2·24
Sour Flats	1·84
Concordia	2 65
Knysna	2·56
Buffels Nek	3·71
Plettenberg Bay	2·23
Blaauwkrantz	3·53
Witte Els Bosch	2·94
Cape St. Francis	3·55
Witteklip	3·53
Uitenhage	1·88
Port Elizabeth (Harbour)	1·77
Tankatara	0·82
Lottering	3·33
Shark's River (Nursery)	1·72
Karnmelk's River	3·74
Vogelvlei	2·53
Great Brak River	1·47
Kruis River	3·03
Armadale	2·00
Centlivres	1·66
Woodifield	2·15
Potberg	1·99

V. SOUTHERN KARROO:

	INCHES
Ladismith	0·99
Amalienstein	0·85
Calitzdorp	0 75
Oudtshoorn	0·35
Uniondale	1·13
Kleinpoort	0·81
Rust en Vrede	1·47

VI. WEST CENTRAL KARROO:

	INCHES
Prince Albert Road	0·04
Fraserburg Road	0·02
Prince Albert	0·13
Zwartberg Pass	1·50
Beaufort West	0·10
Dunedin	0·37
Nel's Poort	0·25
Camfer's Kraal	0·08
Willowmore	0·02
Steytlerville	0·37
Krom River	0·16

VII. EAST CENTRAL KARROO:

	INCHES
Aberdeen (Gaol)	0·45
Aberdeen Road	0·40
Rietfontein	0·00
Kendrew	0·49
Graaff-Reinet	0·98
New Bethesda	0·65
Roode Bloem	0·71
Patrysfontein	0·84
Toegedacht	0·43
Klipfontein	0·43
Cranemere	0·57
Pearston	0 66
Middleton	0·50
Corndale (Div. **Aberdeen**)	0 53
Cookhouse	0·50
Middelwater	0·54
Buffelskloof	1 39
Klipplaat	0·15
Glen Harry	0·74
Bloemhof	0·64
Walsingham	0·60
Spitzkop	1·00

VIII. NORTHERN KARROO

	INCHES
Sutherland	0·20
Fraserburg	0·15
Carnarvon	0·40
Wagenaar's Kraal	0·56
Brakfontein	0·57
Victoria West	1·33
Britstown	1 35
Murraysburg	0·72
De Kruis	1·70
Richmond	0·75
De Aar	1 83
Middlemount	0·31
Philip's Town	1·97
Boschfontein	1 42
Petrusville	1·04
The Willows	0 80
Naauwpoort	1·70
Middelburg	1·57
Colesberg	2 10
Tafelberg Hall	1·50
Cradock	0·75
Witmoss	0·99
Steynsburg	1·20
Quagga's Kerk	2·14
Tarkastad	0·79
Riet Vlei	1·03
Varken's Kop	1·18
Culmstock	1·04

VIII. N KARROO—*Continued*

	INCHES
Houwater Dam	1·22
Hillmoor	1·08
Fish River	0·97
Loxton	1·08
Waverley	1·05
Maraisburg	1·05
Gannapan	0·80
Montagu	1·78
Schuilhoek	1·18
Vosburg	1·31
Zwavelfontein	0·22
Arundel	1·18

IX. NORTHERN BORDER:

	INCHES
Pella	0·39
Kenhardt	0·78
Van Wyk's Vlei	0·43
Prieska	1·22
Dunmurry	0 68
Griqua Town	0 86
Douglas	0·91
Avoca (Herbert)	0·58
Hopetown	1·12
Newlands (Div. **Barkly West**)	0 35
Kimberley (Gaol)	0·42
Do. (**Stephens**)	0 84
Barkly West	0 54
Upington	0·45
Trooilapspan	0·46
New Year's Kraal	0·51
Karree Kloof	1·04

X. SOUTH-EAST:

	INCHES
Melrose	1 04
Cheviot Fells (**Bedford**)	2·12
Alicedale	0·47
Bedford (Gaol)	2 00
Sydney's Hope	1·22
Cullendale	2·71
Adelaide	1·68
Atherstone	1·30
Alexandria	1·53
Salem	0·70
Graham's Town (Gaol)	2·37
Do. (**Bact. Inst.**)	2·22
Heatherton Towers (**near Graham's Town**)	1·02
Fort Beaufort	1·50
Katberg	2·24
Seymour	2·39
Glencairn	1·69
Port Alfred	1·04
Hogsback	3·06
Thaba N'doda	2·18
Peddie	1·01
Cathcart	1 60
Keiskama Hoek	2·70
Thomas River	2·20
King William's Town	2·08
Do. **Hospital**	1·82
Stutterheim (**Besté**)	2·42
Dohne	1·92
Albertvale	1·50
Blackwoods	2·06
Kubusie	3·18

X. SOUTH-EAST—*Continued*

	INCHES
Blaney	2·53
Kei Road	2·71
Evelyn Valley	5·89
Berlin	2·32
Isidenge	4·21
Perie Forest	2·55
Quacu Forest	2·24
Kologha	2·93
Fort Jackson	1·80
Komgha	4·39
Prospect Farm (Div. Komgha)	3·87
East London, West ..	0·79
Do East	1·76
Bolo	2·70
Fort Fordyce	3·23
Lynedoch	2·01
Sunnyside	1·93
Exwell Park	1·09
Crawley	1·25
Forestbourne	4·17
Chiselhurst	1·49
Cata	3·07
Wolf Ridge	3·24
Dontsah	3·65

XI. NORTH-EAST:

	INCHES
Venterstad	1·65
Ellesmere	0·87
Burgersdorp	1·09
Molteno Station	1·41
Thibet Park	1·06
Sterkstroom	1·36
Rocklands	1·10
Aliwal North (Gaol) ..	0·67
Do. (Brown) ..	0·73
Rietfontein	1·29
Hex's Plantation	1·86
Carnarvon Farm ..	1·97
Jamestown	1·50
Queenstown (Gaol) ..	1·80
Do. (Beswick) ..	2·07
Tylden	1·50
Herschel	1·93
Lady Grey	1·96
Bolotwa, Contest	1·93
Lady Frere	1·80
Keilands .. .	2·22
Barkly East	0·84
Lyndene .. .	1·06
Mooifontein	1·30
Poplar Grove	1·18
Whittlesea	1·10
Halseton	1·65
Sterkspruit ..	0·91
Table Hill	2·04

XI. NORTH-EAST—*Continued*

	INCHES
Hughenden	0·72
Glen Wallace	2·11

XII. KAFFRARIA:

Slaate, Xalanga	3·37
Ida, Xalanga	3·01
Kokstad (The Willows) ..	3·99
Cofimvaba	1·45
Nqamakwe	4·05
Main	4·16
Engcobo	2·96
Butterworth	3·85
Kentani	6·79
Maclear	1·95
Willowvale	4·26
Elliotdale	4·06
Matatiele	2·35
Umtata	2·27
Kokstad	3·57
Port St. John's	6·28
Umzimkulu	6·04
Tabankulu	4·92
Somerville (Div. Tsolo) ..	1·69
Tsomo .. .	2·39
Woodcliff	2·82
Bazeya	4·00
Cwebe	1·95
Seteba	2·10
Flagstaff	5·23
Insikeni	2·19
Cedarville	2·09
Xalanga	0·88

XIII. BASUTOLAND:

Mafetong	1·79
Qacha's Nek	0·38
Moyeni Quthing	2·34
Teyatayoning	0·00
Maseru	1·19

XIV. ORANGE RIVER COLONY:

Imperani	0·80

XV. NATAL:

Durban, Observatory ..	0·81

XVII. BECHUANALAND:

Vryburg	0·26
Taungs	0·35
Setlagoli	0·15
Zwartlaagte	0·10

XVIII. RHODESIA:

Hope Fountain	0·00
Matopo Park	0·03
Fort Rixon	0·04

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 10th June, 1905, ruling at the several centres named, is published for general information:—

CENTRE.	A. Wheat per 100 lb.	B. Wheat Flour per 100 lb	C. Boer Meal per 100 lb	D. Mealies per 100 lb	E. Mealie Meal per 100 lb.	F. Barley per 100 lb.	G. Oats per 100 lb	H. Oat-hay per 100 lb	J. Potatoes per 100 lbs.	K. Tobacco (Boer Roll) per lb.	L. Beef per lb	M. Mutton per lb	N. Fresh Butter per lb	O. Eggs per doz	P. Cattle (Slaughter)	Q. Sheep (Slaughter)
	£ s d	£ s d	£ s d	£ s d	£ s d	s. d	s d	£ s d	£ s d.	£ s d	s d	s d	£ s. d.	s d		
Aliwal North ...	0 12 0	0 14 0	0 13 6	0 6 0	0 9 0	10 0	9 0	0 7 6	0 11 0	1/6 to 4/-	*0 7	*0 6	0 1 0	3 9	£12	24/-
Beaufort West	0 12 6	0 18 6	0 13 0	0 10 0	0 11 6	10 6	8 0	0 6 6	0 10 0	0 0 11	*7d to 1s †6d to 11d	*8d & †6d to 11d	0 2 0	3 0	£18	25 -
Burghersdorp ...	.	...	...	.	..		.		0 9 0	...	*0 8	0 8	0 1 5	2 6	...	...
Cape Town .	0 9 9	0 12 4	0 10 0	0 6 9	0 8 3	7 0	6 4	0 4 0	0 9 4	0 0 8	0 10	0 10	0 1 4	2 0	£16 to £20	25/-
Clanwilliam ..	0 11 3	1 10 0	0 12 3	0 12 0	...	12 0	10 0		0 12 0	0 4 6	*0 8	*0 8	0 2 0	1 3	...	...
Colesberg ..	0 10 0	...	...	0 6 0	..	.			0 13 6	...	..	.	0 1 0	2 6	...	...
Cradock .	0 10 6	...	0 10 6	0 6 6	.	8 9	...	0 7 6	0 12 0		...	*0 8	0 1 4	2 3	...	...
Dordrecht ..	0 12 0	0 15 6	0 12 6	0 8 0	0 8 6	10 0	8 0	0 6 0	0 9 0	0 1 0	*0 8	*0 7	0 2 0	3 0	£12	20/-
East London ...	0 13 0	0 15 6	0 13 0	0 7 6	0 10 0	8 0	11 6	0 6 9	0 10 0	0 1 6	†9d & *9d	8d & 9d	0 2 6	3 0	£22	37/6
Graaff-Reinet ..	0 10 6		..	0 7 6	...	8 0	...	0 7 6	4 6 to 8/	0 0 6	*0 7	*0 6	0 1 9	2 6	£10 to £12 10s	23/-
Graham's Town	0 9 0	...	.	0 9 3		7 9	..	0 7 0	0 12 6	...	*0 9	*0 9	0 2 1	2 3	...	...
Kimberley ...	0 10 6	0 14 6	0 13 0	0 7 0	0 6 9	8 0	8 0	0 5 6	0 16 0	0 0 7	*0 10	*0 7	0 1 6	1 9	£12 to £14	18/- to 22 -
King Wm's Town	0 9 0	0 15 0	0 12 6	0 7 0	0 7 0	11 0	9 6	0 6 6	0 10 6	0 0 8	a0 7	a0 7	0 1 9	2 0	£13 15s.	20/-
Malmesbury ...	0 8 6	0 13 6	0 10 6	0 7 6	...	7 6	7 6	0 3 8	0 8 4	0 1 0	*6d & †8d	*9d & †9d	0 0 9	1 6	£16	23/6
Mossel Bay ...	0 10 0	0 15 0	0 18 0	0 15 0	...	4 0	6 0	0 2 6	0 12 0	0 1 0	8d & 9d	8d & 9d	0 1 6	1 6	...	...
Port Alfred ...	0 10 6	0 19 0	0 15 0	0 8 6	0 13 0	6 0	10 0	0 4 0	0 14 0	0 0 9	*0 9	*0 10	0 1 9	1 6	...	...
Port Elizabeth ...	..		...	0 7 3	.		...	0 5 0	0 12 0	0 0 4	*0 7	*0 8	0 1 9	3 0	.	...
Queen's Town ...	0 7 9	0 16 0	0 10 6	0 6 0	0 7 3	7 3	7 0	0 7 6	0 7 6	0 1 7	a0 8	a0 7	0 1 6	2 6	£10 to £15	21/-
Tarkastad ...	0 13 0	0 13 6	0 13 3	0 12 6	0 13 0	12 6	.	0 9 0	0 15 0	0 1 1	*8d & †7d	*8d & †6d	0 1 6	2 9	£13	21/-
Vryburg ...	0 11 6	0 17 6		0 6 6		12 0	9 0	0 7 6	0 8 0	0 0 9	...	.	0 1 9	1 9	£11 10s	20/
Worcester ...	0 10 6	0 15 6	0 11 3	0 8 6	0 9 6	8 0	7 6	0 4 3	0 8 0	0 0 8	*9d & †8d	*8d & †7d	0 1 6	2 0	£12 to £15	18/- to 21/-

NOTE.—A blank space denotes "no transactions   a No Imported meat   * Colonial.   † Imported.

DEPARTMENTAL NOTICES.

Ports of Entry for Livestock into Orange River Colony.

The subjoined corrected list of Ports of Entry for livestock from the Cape Colony into the Orange River Colony, together with the conditions imposed by that Colony, is hereby published for general information

D. HUTCHEON,
Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon,
Cape Town, 26th June, 1905.

PORTS OF ENTRY FOR LIVESTOCK.

(1) Frere Railway Bridge
(2) Bethulie Railway Bridge
(3) Norval's Pont Railway Bridge
(4) Colesberg Road Bridge
(5) Dalton's Pont on the Farm Welgedraai, division of Fauresmith.
(6) The Farms Ramah and in the division of Jacobsdal.
(7) Karreelaagte
(8) The Farm Rosebery Plain for the division of Kimberley (Welgevonden.)
(9) The Farm Rietpan, division of Boshof.
(10) The Farm Charlottesdal

CONDITIONS OF ENTRY.

Proclamation by His Excellency the Acting Lieutenant-Governor of the Orange River Colony

Under and by virtue of the powers and authorities in me vested by the Animal Diseases Ordinance, 1903, and the Scab Ordinance, 1903, I do hereby proclaim, declare and make known as follows —

1. From and after the date of the publication of this Proclamation, it shall not be lawful to introduce horned cattle, sheep or goats into this Colony from the Colony of the Cape of Good Hope except in accordance with the regulations contained in the Schedule hereto

2 Any person who shall contravene any of the provisions of this Proclamation or of the regulations contained in the Schedule hereto shall upon conviction be liable to a fine not exceeding Fifty Pounds Sterling, or in default of payment to imprisonment, with or without hard labour, for a period not exceeding three months unless such fine be sooner paid.

GOD SAVE THE KING.

Given under my Hand and Seal this 3rd day of February, 1904.

H. F. WILSON,
Acting Lieutenant-Governor.

By Command of His Excellency the Acting Lieutenant-Governor.

B T. BLACKWOOD,
Acting Colonial Secretary.

Schedule

(1) The person in charge of horned cattle, sheep and goats introduced under this notice shall obtain and have in his possession a certificate in the form set forth in Annexure "A" hereto, issued and signed by the Resident Magistrate, Veterinary Officer, Justice of the Peace or Inspector of Sheep of the District in the Cape Colony from which the cattle, sheep or goats have come.

(2) The person in charge of such cattle, sheep or goats is liable to be called upon to produce the Certificate aforesaid to the Inspector of Stock at any of the Ports of Entry mentioned in Annexure "B" hereto, or any Justice of the Peace, Police Officer or owner of land over which such cattle, sheep or goats may pass or be passing.

Annexure "A"

I do hereby certify that the herein specified (cattle, sheep or goats) are free from infectious or contagious disease and have not been in contact with infected animals, and to the best of my knowledge and belief, have not come from or through a locality where any such disease is known to exist, viz.

Number and general description of (cattle, sheep or goats)

Place from which sent.........................

Owner's name and address.................. ....

Name of person in charge...................................

Place in the Orange River Colony, to which cattle, sheep or goats are sent

Signature of Resident Magistrate, Veterinary Officer, Justice of the Peace, or Inspector of Sheep of the District in the Cape Colony from which (the cattle, sheep or goats) have come.

Place

Date.

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c. are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town.

Agricultural Miscellanea, price 6d. each. Extracts from Vols. I. to V of *Agricultural Journal.*

Stock Farming; Artificial Grasses and Fodder for Stock; Ensilage; Dairying; Treatment of Cereal and other Crops; Viticulture and Wine Making; Forestry, Locusts and their Destruction; Possible New Industries for Cape Farmers.

Agriculture.

Wheat Production in Australia (1s 6d.) by A. C. Macdonald; *Wheat Production in Australia (1s 6d.) by W. Halse and J. D. J. Visser; Hop Cultivation (3d.) translated by A W. Heywood, *Agricultural Weather Forecasts (1d.); *Brak Land in Relation to Irrigation and Drainage (1d), *Poultry Raising (1d.); Tobacco Cultivation by Schenck, (3d.); Tobacco Cultivation by Bornemisza (1d.); The Velvet Bean (1d.), Potato Disease (1d) · Scheme of Manurial Experiments (1d.); Leguminous Forage Crops for Trial in Cape Colony (1d.); Grasses for Trial in Cape Colony (1d.); Sundry Forage Crops for trial in Cape Colony (1d), Poultry in South Africa: Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d.); The Salt Bushes (1d.)

Dairying.

Dairy Breeds by A C. Macdonald (9d); *Dairy Industry in Great Britain by A. C. Macdonald (6d.); †Dairy and its Products by D. Hutcheon (2d.); *Dairy Industry in Denmark (2d); Ready Reckoner for Cream Testing (1s.); †Butter and Cheddar Cheese Making (1d.)

Entomology.

The Bont Tick (1d.), Bean Bruchus 1d.; Cabbage Aphis (1d.); Codling Moth in Madeira Fruit (1d.), *Codling Moth (1d.); Citrus Psylla (1d), Fruit Fly (1d.); Fumigation Supplies (1d); *Cyanide Gas Remedy for Scale Insects (3d.); †Hessian Fly (1d), Insect Friends and Foes (1d.); Methods of Locust Destruction (1d); *Peach Yellows (1d); Pear Slug, Paris Green (1d); Remedy for Mestwurmen (1d.); *Spray Calendar (1d.), *Spray Pump Notes (1d.): Scale Insects on Ornamental Trees and Plants (1d.); Two Pine Apple Pests (1d); Tree Fumigation in California (1d.), Winter Spraying (1d.), Wattle Bag Worm (1d.), Bordeaux Mixture (1d); Deaths Head Moth Superstition (1d); Fumigation under Box Covers (1d.); The House Fly (1d), Revised Plant Import Regulations (1d.); New Oak Tree Pest (1d): Nursery Inspection and Quarantine Bill (1d.); Oil Water Pumps (1d.); The Plague of Ticks (1d); Potato Tuber Moth (1d.); Treatment of Buildings with Hydrocyanic Acid Gas for Destruction of Vermin (1d.); The Codling Moth; Notes on its Life Cycle and Remedies (1d.); Gall Worms in the Roots of Plants (1d); The Fruit Fly,* (with coloured plates) (3d.); *Gas Treatment for Scale Insects (3d.); Another Introduced Scale Pest (1d); Washes for Red Scale (1d.); Fruit Fly: Peach Fly (1d.); Lime-Sulphur-Salt Wash for Scale Insect (1d); Cyanide Gas Fumigation (1d.); The Fruit Moth 1d.)

NOTE.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

Forestry.

British National Forestry (1d); Botanical Observations on Forests in Eastern Pondoland (1d), Elementary Principles of Sylviculture or Woodcraft (1d.); National Forests (1d.), Tree Planting (5d.), *Tree Planting for Farmers (1d.); Indigenous Timbers of the Cape (1d); Misuse of Coal and the Uses of Forests (1d); Tree Planting for Timber and Fuel (1d.)

Fisheries.

Trout and Carp Breeding and Stocking of Streams (1d.); *Methods of Preserving Fish by Smoking (1d)

Horticulture.

Fruit Culture in the Gamtoos River Valley (1d); *Marketing of Fruit (1d.); Manual of Practical Orchard Work at the Cape (6d), The Olive at the Cape (2d); Tomatoes and Fruit for Export (1d.); Citrus Culture in Cape Colony: Report of the Citrus Commission (1d), *Fruit from Orchard to Buyer (1d); Netting for Fruit Trees (1d.)

Veterinary and Animal Industry,

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d), Diseases of the Horse and their treatment (1s), Horse Sickness (2d), * Heartwater (1d); * Liver Disease among Calves (3d); Lungsickness of Cattle (1d), * Malarial Catarrhal Fever of Sheep (1d); *Preventive Vaccination against Anthrax and Swine Fever (1d), Rinderpest. Dr Koch's Report (1d.); *Inoculation against Rinderpest (1d); Dr. Kohlstocks Report on Inoculation for Rinderpest (1d), *Redwater, Texas Fever or Tick Disease (1d), *Redwater, Anthrax and Quarter Evil (1d.); *Scab and its Nature (3d.); *Sheep and Wool (1d), Treatment for Worms in Domestic Animals (1d.); †International Conference of Sheep Breeders (1d), The Eye and its Diseases (1d.) Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.), Heartwater in Calves (1d.); Tick Heartwater Experiments (1d), Indigestion and Diarrhœa in Calves (1d), Persian Sheep and Heartwater (1d), Poisoning of Stock (1d); Retention of the Fœtal Membrane, or Afterbirth in Cows (1d), Stijfziekte, Lamziekte or Osteo-Malacia and Paralysis (1d). Transmission of African Coast Fever (3d.); Tuberculosis and the Use of Tuberculin (1d), African Coast Fever with Description of Dipping Tank (3d), Notes on the so-called Paralysis Tick (1d.); *Rinderpest in South Africa (3d) by D Hutcheon, *Fluke or Slak in Liver of Sheep (3d)- *coloured plate*, *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d.), Osteo Porosis (3d)—*coloured plates.*

Viticulture.

†Reports on Viticulture (3d.); *Reconstitution of Phylloxerised Vineyards (1s.); Report on Failure of Hanepoot Grapes on American Vines (1d); The Making of Wine and its By-Products (6d.); How to Treat Wine Casks (1d.), Failure of Vines (1d)

Miscellaneous.

Game Seasons (3d.); Land Laws of Cape Colony (1d.). *Monsonia: the Cape Cure for Dysentery (1d), *Rainfall of South Africa (1d.), Sand Dunes of Gascony (5d), The Metric System (1d.); South African Stud Book, Constitution, Rules, &c., Transvaal Plant Import Regulations (1d.)

NOTE.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

THE PRODUCE MARKET

CAPE TOWN.

Mr. R. Muller supplies the following report for the month ending June 20th, 1905:—

Wool.—The season being practically over, only odd parcels have been submitted in Greasies. Prices for all good conditioned lots are firm with an upward tendency. Washing parcels are eagerly competed for, and a fair amount of business has been done in these. Reports from London and other wool consuming countries are satisfactory and the Wool Trade seems to be in a healthy condition. While Crossbreds shewed a phenomenal rise in the last London Sales, Fine Merinos were firm at from par to half-penny advance. Snow Whites were in strong request and may be quoted from ½d. higher for best qualities and 1d. higher for Medium Sorts. In our market some good parcels were offered ; prices for Super Lots reached 1s. 10d. per lb.

	s.	d.	s.	d.		s.	d.	s.	d.
Super Long Grass Veld Wool	0	8	0	9	Short and Inferior ..	0	4	0	5
Super Long Karroo Veld Wool	0	6¾	0	7½	Wool for Washing ..	0	4½	0	6
Medium Karroo Veld Wool	0	5	0	6	Snow-white Super to Extra	1	5	1	9
					„ Ordinary	1	2	1	5
					Fleece Washed ..	0	9	0	10

Mohair.—A sharp advance has been experienced in Firsts and Kids within the last week. Parcels coming forward are eagerly competed for, and a brisk business has been done in the country on orders being placed by representatives of Bradford buyers.

	s.	d.	s.	d.		s.	d.	s.	d.
Mohair, Firsts, Summer	1	0	1	2	Mohair Winter ..	0	10	0	11½
„ Kids.. ..	1	3	1	5	„ „ Kids..	1	0	1	3
„ Seconds ..	0	6½	0	10					

Ostrich Feathers.—The news of the doings of the London Sales is to hand, which shews that Superior and Medium Class Wing Goods shewed an advance on last sales' rates. Dark Feminas, Fancy Spadonas, White Tails, Long and Medium Blacks and Drabs were also higher, while Inferior Whites, Feminas and Floss were lower.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Primes	10	10	0	35	0	0	Floss	0	5	0	1	10	0
Firsts, Ordinary to Super ..	8	0	0	10	10	0	Long Drabs	2	10	0	4	10	0
Seconds ..	6	0	0	9	0	0	Medium Drabs.	1	5	0	1	15	0
Thirds ..	3	10	0	6	0	0	Short to Medium	0	10	0	1	10	0
Femina (super)	7	0	0	10	0	0	Floss .	0	2	6	1	10	0
Femina, Seconds to Firsts ..	4	0	0	6	10	0	White Tails .	1	5	0	1	15	0
Byocks (fancy) ..	5	0	0	7	10	0	Coloured Tails.	0	5	0	1	10	0
Long Blacks ..	4	10	0	7	10	0	Chicks .	0	1	0	0	2	0
Medium Blacks	3	0	0	3	10	0	Spadonas .	2	10	0	4	0	0
Short to Medium	0	10	0	2	10	0	Inferior Black & Drabs, Short to Long ..	0	0	6	1	10	0

Skins and Hides.—There is a good demand for all classes with slightly higher prices for Wool Skins, while Goat Skins declined from ¼d to ½d per lb. Hides are firm at last quotations.

PORT ELIZABETH.

Messrs. John Daverin and Co., report under date June 9, 1905:—

Ostrich Feathers.—On Tuesday we received a cable re the opening of the London Sales reading :—Whites and Feminas ten per cent. lower, Blacks and Drabs 5 per cent. dearer, Spadonas 5 to 10 per cent. higher. The decline on Whites and Feminas was quite unexpected and has had a very unsettling effect upon our market, which only lasted for a few hours on Tuesday. There has been little or no business done out of hand during the week. Stocks continue heavy, but new arrivals are limited and are likely to continue so for some little time. The total quantity sold on the public market this week amounted to £2,658 18s. 5d. and weighed 1,370 lbs. 3½ ozs.

	£	s.	d.	£	s.	d.
Primes : Extra super				Special Prices.		
Good to super	10	0	0	12	0	0
Whites : Firsts	6	5	0	9	0	0
Seconds ..	4	10	0	5	10	0
Thirds ..	2	10	0	4	10	0
Feminas : Tipped						
and Grey ..	5	0	0	7	0	0
Seconds ..	2	5	0	4	0	0
Thirds ..	1	7	6	2	5	0
Fancy ..	4	5	0	6	10	0
Tails : White ..	1	7	6	2	10	0
Light ..	1	0	0	1	10	0
Coloured & Dark	0	5	0	0	15	0

	£	s.	d.	£	s.	d.
Blacks : Long ..	3	5	0	4	15	0
Medium ..	1	7	6	2	12	6
Short ..	0	10	0	1	0	0
Wirey .	0	1	0	0	1	6
Floss ..	0	6	0	1	7	6
Drabs : Long ..	1	12	6	2	15	0
Medium ..	0	15	0	1	7	6
Short ..	0	2	6	0	6	0
Wirey ..	0	0	6	0	1	0
Floss ..	0	6	0	1	7	6
Spadonas : Light	2	0	0	3	10	0
Dark ..	0	12	6	1	12	6
Chicks ..	0	0	3	0	1	6

Wool.—This market remains very firm, and all new arrivals (which are mostly made up of oddments) are readily sold at full current prices.

Snowwhite Extra Superior ..	19d	20¼d
Snowwhite Superior ..	17d	18½d
Do Good to Superior	16d	16½d
Do Inferior Faulty	15d	15½d
Grease, Super Long, well-conditioned, Grassveld grown, special clips	7d	8d
Grease, Super Long, well-conditioned, Grassveld grown ..	6¼d	7d
Grease, Super Long, well-conditioned Karoo Grown ..	6d	6½d
Grease, Super Long, well-conditioned, Mixed Veld ..	5¾d	6½d
Grease, Light, faultless, medium, Grassveld grown.. ..	6d	6¼d
Grease, Light, faultless, medium Karroo grown	5½d	6d
Grease, Light, faultless, short Karroo grown	5¼d	6d
Grease, Short, faulty and wasty ..	4½d	4¾d
Grease, Coarse and Coloured ..	4⅝d	4⅞d
Scoured, Coarse and Coloured ..	6½d	10½d
Free State Grassveld Grease, long and well-conditioned ..	6d	6¼d
Free State medium grown, light, with little fault ..	5¼d	5½d
Free State short, faulty and wasty ..	4½d	5d
Free State Karroo grown, long and well-conditioned ..	5¼d	5¾d
Free State medium grown, light, with little fault ..	5d	5½d
Free State short, faulty and wasty ..	4½d	4¾d

Mohair.—This market has been very active during the week and about 1,250 bales of firsts changed hands, the bulk at 14½d. and for some very choice lots up to 15d. was paid. About 60 bales of super kids also sold at 18d

Superior Firsts special clips	15d
Ordinary Firsts ..	14½d
Long Blue O R C. Hair	None offering.
Super Kids ..	18d
Ordinary Kids ..	17d to 18d

Mixed Hair ..	0s	9½d	0s	10¾d
Seconds and Grey ..	0s	7d	0s	8½d
Thirds . ..	0s	5¼d	0s	6d
Winter	None offering.			
Do. Kids ..	None offering.			

Skins.—Sheepskins sold in bundles at 6¾d per lb.; Pelts at 4½d; Capes, 1s 6d, damaged, 6d each; Angoras, 6¾d, Shorn, 5d; damaged, 3¼d; Goat, 10¾d; damaged, 5½d. per lb, Springbok, 8d each.

Hides.—Sun-dried Hides sold this week at 7¾d, damaged, 6d; Drysalted, 7d; damaged, 5¾d, and Thirds, 3½d.

Horns.—Parcels all round sold at 3½d each

THE

Agricultural Journal.

OF THE CAPE OF GOOD HOPE.

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All communications should be addressed :
"The Editor, Agricultural Journal, Department of Agriculture, Capetown."
Telegraphic Address : "Bulletin," Capetown.

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NOTES.

Nurseries Inspection Act.

Attention is directed to the notice in another part of this issue calling upon all nurserymen in the Colony to register their nurseries under the provisions of the Nurseries Inspection and Quarantine Act on on before September 1st. The certificates of registration will be issued by the Government Entomologist. An application may be addressed directly to him, or be sent to the Resident Magistrate of the district in which the nursery is located. The failure of a nurseryman to register will constitute a violation of the Act and make him liable to a heavy fine. In anticipation of the visit of the Inspectors, nurserymen are recommended to do their utmost to rid their premises of all scale insects and aphides. The nursery stock must be free of *pests, and also all other plants growing within twelve yards, before* a certificate to permit of stock being sent outside of the district in which it which it is grown will be issued. Copies of the Act may be obtained from the Government Entomologist.

Bird Netting.

The Secretary of the Western Province Horticultural Board desires it to be known that he has some bird netting to dispose of, having more on hand than has been taken up so far. Full particulars can be obtained on application to Mr. C. Mayer, Secretary W. P. Horticultural Board, Stellenbosch.

The Wine Show.

The attention of all wine farmers and those interested in the wine industry is directed to the decision of the Western Province Horticultural Board to hold a Wine Show in Paarl in October. Mr. J. W. Jagger, M.L.A., has kindly offered two valuable silver cups for competition. Full particulars, with prize list, &c., will appear in the next issue of the *Agricultural Journal.*

Prize Essays—"Plants Poisonous to Cattle."

At the meeting of the Griqualand West Farmers' Association, held on the 10th of June last, the following resolution was passed, which we have been requested to publish:—"That a prize of the value of £10 10s. be offered for the best Essay (accompanied by properly dried and named specimens) on all Plants Poisonous to Cattle and Livestock, which grow in the Kimberley district, such Essays to be sent to the President, Mr. D. J. Haarhoff, M.L.A., Kimberley, before the 10th January, 1906. No prize awarded unless the Essays be of sufficient merit. Professor MacOwan and Dr. Schönland to be the Judges."

"Droughts and How to Fight Them."

The Somerset East Farmers' Association is following on the same lines offering a prize of £10 for the best Essay on the above subject. Competitors will be expected to deal with droughts, their causes, and effects on farming in South Africa; how far the causes can be brought under control, and the evil effects minimised, by the efforts of individual farmers and co-operative enterprise, and how far Government should assist in private enterprise and in the construction of large public works. The Judges (the Hon. P. W. Michau, M.L.C., Mr. W. R. Southey, and Mr. W. B. Gordon, Director of Irrigation) will be requested to attach greater value to practical suggestions than to the literary style or scientific knowledge shewn by the writer. Essays must be in the hands of Mr. A. P. Myburgh, Hon. Secretary, Farmers' Association, Somerset East, on or before 30th September. Dr. Moolman has kindly supplemented the above by a second prize of £5.

The Mealie-stalk Borer.

Everyone interested in the production of mealies should read the illustrated article in this issue by Mr. C. W. Mally, on that notorious pest, the Mealie-stalk Borer. And, what is more to the point, should carefully note what he has to say on the subject. The valuable part of the article is its thoroughly practical tone. Theorizing on a matter of this nature is not very difficult, but Mr. Mally has gone much further. He actually demonstrated by practice in the field that the pest can be controlled, as the record shews, and such valuable work is worthy of the fullest appreciation. The highest acknowledgement of its value would be for all mealie growers, either troubled or threatened with the borer, to follow on the lines indicated, and thus initiate organised efforts to minimise the losses so frequently sustained. We all know of the benefactor to mankind who makes two blades of grass grow where one grew before. Mr. Mally indicates the lines upon which something even more valuable can be done, for mealies are the natural cereal crop of a very large section of this country, and by preventing the ravages of a destructive pest of this nature it may mean, ultimately, the production of large crops, where very poor ones were grown before.

Fruit Culture.

Mr. Lounsbury's article on Fruit Culture in Argentina sounds a note of warning to those of our fruit growers who are relying upon the European markets. Fruit culture in the Colony,—particularly in the Western Province,—is undoubtedly entering a critical period in its development, for after years of planting an abundance of fruit is certain to be soon produced. Thus far all has gone well with the infant industry. In general intelligence and in knowledge of his speciality, the Colonial grower ranks very high. Nowhere in the world are better kept plantations of fruit trees to be found and nowhere, it is safe to say, is better fruit produced. The townspeople seem hardly awake to these conditions yet, but that doesn't affect their truth. The questions now are, how will the fruit industry continue to pay, and in what lines are extensions justified?

The Cape, unfortunately, has not collected agricultural statistics that would be of much assistance in forecasting answers to these problems. Only rough estimates can be made of the numbers of fruit trees in bearing, and coming into bearing, and how these numbers are divided amongst different kinds. Of what kinds have we too many, and of what not enough? To what extent can our markets be made to take more fruit at a profit to the seller? We all know that there is almost no demand for fruit by jam manufacturers, but just why is this, and what are the future prospects? What is the local consumption of jams, and to what extent can the imported article be supplanted by the Cape product? What are the demands for evaporated and canned fruits of different kinds, for which Cape producers may cater? If satisfactory answers to these questions were obtainable, our fruit growers would know very much better how they stand with the world. As matters are, the road ahead may be safe—but it is not quite luminous.

There seems no doubt that a very much better demand for fruit can be worked up in the towns in this Colony, and in the country too. Fruit both fresh and preserved, is regarded too much as a luxury in South Africa. It could, with advantage to the consumers, be made to figure in every meal in almost every home every day in the year. Canned fruit is little used in South Africa, not because the people do not like it but because they do not know how to prepare it themselves and find the imported product too expensive for general use. In America, canned fruit is a daily article of food on the tables of the artisan class for months together, and it is common to find scores and even hundreds of jars of home preserved fruits in the pantries of the poor. In South Africa the same class of people gets very little fruit, except, perhaps, Natal bananas, other than jam in small quantities. With increased production, and increase in knowledge how to prepare fruit for the table, the Colonial consumption should increase from year to year much more rapidly than the population. But for a few years the prospective fruit planter should very carefully consider what to plant.

Citrous fruits are likely to be over done in the Western Province. Already there are signs of over-production. One prominent grower is now advertising oranges, lemons and naartjes at 4s. 6d. a hundred delivered at one's railway station. There is no doubt that better oranges can be produced in the Eastern Province, and that much more cheaply, than in the Western. The trees grow well enough in the south-western districts but, apparently for climatic reasons, there are only a few localities here where the fruit reaches the size and quality attained in warmer inland and eastern sections. Whether or not an export trade in citrous fruits can be developed remains to be discovered.

To continue planting peaches extensively seems risky if the English market is to be captured by the Argentine as Mr. Lounsbury suggests is probable. The outlook for sending plums over-sea is not rosy for the same reasons; but it has to be remembered that an immense number of the plum trees planted in the Colony were set between pear trees and must soon be removed to make room. Therefore there seems much less danger of a glut in plums than in peaches.

Pears seem a safe investment, and the orchardist with large plantations of Williams convenient to Cape Town for export or near a colonial market ought to feel happy. The over-sea market is very good, and the South American fruit countries do not seem likely to compete severely. As in America, the tendency at the Cape is to hold to the Williams as the leading variety.

Apples are very profitable at present, that is to those who haven't the Codling Moth and to those who energetically combat this pest. Many townspeople still declare the Cape too warm for apple culture, but there seems little foundation for this pessimism. Many of the varieties now grown at the Cape are much superior to the varieties brought into our markets from the Australasian Colonies, and in a few years we should have the South African market exclusively to South African apples for all except two or three summer months. It is commonly said that our apples do not keep, but this is a mistake. They keep very well in cold storage. Samples of some varieties have been kept in good condition at ordinary temperatures well into July; the writer was shown some perfectly sound Wemmers Hoek Apples, on one farm July 14th, and elsewhere saw samples of other varieties on the 19th. Hence with proper care, the grower should be able to hold back his crop if the markets are glutted at plucking time.

Some apple growers believe that in time apples will be profitably exported, not from the coast districts but from inland parts where the winters are colder and where suitable land is cheaper. Mr. H. E. V. Pickstone, the well-known nurseryman. is showing his faith in such a future. He has bought a farm in the Orange River Colony, and during the last year has planted fifteen hundred apple trees on it.

South African prunes and evaporated apricots are a distinct success, and should oust the imported articles almost entirely. The planting of apricots seems to have ceased, but prunes are still being planted. The Californian prunes sold in Cape Town are poor in comparison with the best Colonial article. If for no other reason the Colonial prune should commend itself by its comparative freshness. If one examines the ordinary imported prune under a magnifying class he is almost sure to see a multitude of loathsome mites, whereas the Cape prunes are clean. That we can grow prunes cheaply enough to develop an export trade, is doubtful, and the limits of the South African markets are not known; but where it is certain to thrive and bear well, the prune seems one of the safest fruit trees to plant commercially, just now.

Light *vs.* Heavy Wools.

"Orangia" writes:—"In the May number of your *Journal* you mentioned a pamphlet issued by Messrs. Mosenthal, warning farmers against breeding heavily yolked wool. In this district nearly every sheep-farmer's ambition is to grow as heavy wool as possible. They argue, and quite rightly too, that the storekeeper gives the same price for every class of wool, heavily yolked or otherwise, and even if they did give a penny a pound more for light wool, heavy wool would still be the most profitable, on account of the extra weight. Country storekeepers as a rule, buy wool simply to get custom, but at the same time they do not buy at a loss to themselves. That being the case, I should be much obliged if you would explain how light woolled sheep can pay better than heavily yolked. I am not writing from idle curiosity, but am myself a sheep farmer, wish to improve my flock and make it as profitable as possible, and I take the liberty of writing to you as I have received much valuable information from your *Journal* in the past, so I trust you will pardon my trespassing on your time and space."

The pamphlet issued by Messrs. Mosenthal should have caused sheepmen in this country to hesitate and think for themselves, for it is a carefully worded warning compiled from the best information available, and written with the full intention of attempting to benefit the sheep industry on the soundest possible lines. Unfortunately it is exceedingly difficult to reach the bulk of our wool-growers direct. As "Orangia" points out, they mostly sell to the local storekeeper who is compelled, in order to retain his customers, to, more or less, fix an average price per pound whether the wool be heavy or light. sound or wasty. The conditions in which he has to make his living are such that he cannot afford to offend anybody and the result is, as a rule, that the one grower gets as much per pound for his heavy greasy clip as his neighbour for a light, clean product. The storekeeper rails the whole as a consignment to Port Elizabeth and East London, and there it has to run tha gauntlet of the expert buyers representing the manufacturers. These, of course, unless the consigments are sorted, buy on an average again, and recently, we are informed, the results have been so poor that heavy losses are sustained. There is scarcely a dealer, produce broker, or wholesale buyer in Port Elizabeth of any standing who is not bewailing the tendency to increased weight shewn lately by our wools. For months past, they state, they find it increasingly difficult to sell the wools at fair remunerative rates, and, what is worse, they state they are losing some of their best markets..

It is a well-known fact that prices for sound light wools are frequently better at our coast ports than can be realised for the same wools in England. The secret of this, for some time at least, was, that United States manufacturers placed large orders to be executed here on the distinct understanding that only light sound wools were bought. When these were obtainable all went well, but it is becoming increasingly difficult to fill these orders so we are losing one, at least, of our best markets. It is only a question of time and the reaction is bound to reach the farmer through the storekeeper. It stands to reason that raw material which has to bear heavy charges for transport and sea-freights should be as pure as possible. Otherwise manufacturers are paying for the transport of so much rubbish per bale shipped. In the case of the United States they also have to pay a high protective duty on the rubbish as well. In such a set of conditions, it is only reasonable to suppose that the permanent well-being of the industry is bound up in the production of the very best we can grow. It is also to be remembered that, owing to the drought in Australia, the wool crop of the world has been short for some years. With the increased output now growing, market conditions will also change. The farmer who grows the yolky fleece may appear to have an advantage for the time being, but the producer of light, clean, sound wools is always sure of his market.

Horses Suitable for Military Requirements.

The Hon. P. D. de Villiers, M.L.C., writing from Beaufort West, says:—" A short article appeared in the June number of the *Agricultural Journal* about the above subject, and I have recently been discussing the matter with several other breeders of horses in this district. All fully recognise the desirability and practicability of breeding a large number of remounts in the Cape Colony, and thus enhance an important item of farming and revive an industry whereby much money which of recent years has passed to the Argentine, Russia and other countries, may be brought to the Colony. However, before registering their names, as suggested in the abovementioned article, these gentlemen and I myself would like, if possible, to be furnished with rather more details upon the proposed scheme. In the first place no mention was made as to whether the horses would have to be trained by the breeder or if they would be bought untrained. Secondly, as to sex, whether stallions, geldings and mares would alike be accepted and finally no indication was given as to the probable price which would be offered.

"If I may be allowed to throw out a suggestion would it not be to the advantage of both the Military and the breeders if the horses were bought as three-year-olds; the Remount Department could then train them in their own manner and to suit their own particular requirements, and the farmer could afford to sell at a lower figure than if he had to keep them for another year, and take the risk of training them himself. Trusting that through your columns this may reach the proper quarter."

As a general rule horses for military requirements are preferred untrained; but we have no positive information as to the intentions or desires of the authorities in this instance. As to sex, geldings and mares are the recognised rule for military work. The suggestion that the age of purchase should be fixed at three years instead of four has a good deal to commend it. There are several advantages which might be quoted in its favour, among them being the fact that the military would get the animals before the breeders would be tempted to work them much.

The Stud Book—Ostriches and Sheep.

Stock breeders generally will be pleased to learn that the organising secretary of the Stud Book Association, Mr. C. G. Lee. has been busy moving through the districts and explaining fully the objects and advantages of the movement. Both at Oudtshoorn and Tafelberg, he met by invitation, a number of ostrich breeders, and discussed with them, the formation of a uniform standard for this particular class of stock. The methods to be adopted for examination and many other questions dealing with the breeding and handling of these highly profitable birds were also fully debated. We understand that the standards fixed upon and the strict rules for examining the feathers as well as the birds will shew that our ostrich breeders intend to raise birds that will be a credit to the country. As much practical experience, gained by years of study by the older men, is being put into the new scheme it will answer the further purpose of handing down to the younger men the concentrated results of the most valuable observations. Again the older breeders will strengthen their position, for after a few years of registration their stock will be acknowledged as pure and of a superior fixed type. These are advantages that are worth money.

The sheepmen have been quite as active, doubtless spurred on by the energetic example of the organising secretary. Much correspondence has passed and many important meetings have been held—for here we have to face a new set of conditions with, in some cases, an idea that there is a conflict of interests. Of course the more the questions are debated in a reasonable spirit the more it is realised that the true interests of all sheep breeders in the country are identical, however different their personal ideals may be. It is gratifying to learn that this condition has been arrived at—as was bound to be the case once the initial difficulty of accepting the principle of opening a section for South African merinos was overcome. It may be safely concluded that our best flocks will be represented in the Stud Book before long. In fact a number of first class flocks have been provisionally entered, the final examinations to be carried out as soon as the fleeces are of the prescribed growth for that purpose. This gives, at a bound as it were, an impetus to one of the staple pastoral industries of the country; and on the soundest possible lines, to the unquestionable benefit of all concerned.

The Blessings of Aridity.

An American (Mr. William Smythe) who has written a book upon the subject, has stated that "arid countries were always rich countries when irrigated." He has shown how the glories of antiquity sprang from the heart of the desert, and among the silent witnesses which had survived the centuries were great irrigation canals, some of which were even in use to-day. Reference is made to the success and methods of irrigation in America, where it had been demonstrated that the average arid soil was equal to the most phenomenal soil in more favoured districts. The States, therefore, spent much money in irrigating these lands, and so successful had been the work that America was laying the foundation of an agricultural revolution. Briefly, the blessings of aridity plus irrigation, are:—(1) Phenomenal fertility; (2) no spoiling of fruit or grain by thunderstorms; (3) no loss by floods, therefore markets could be regularly supplied; (4) the soil could be worked whenever desired, and a crop could be secured every year. Above all, arid-region farming meant the cultivation of small areas, and, therefore, the maintenance of a large population on the land. We have plenty of aridity in South Africa; all that is needed is water for irrigation.

FARM AND VELD.

Seaweed as a Manure.

A great opportunity as yet unused awaits the farmers of the Peninsula and the Cape Flats generally of utilising the great heaps of Sea-weed that are from time to time thrown up along our shores after gales. It is not generally known that Seaweed is at least as valuable as stable manure when fresh, and even more so when dry. Before use, however, it should be well rotted and may with advantage be mixed with other refuse and dung. We are given to understand by the civic authorities that no difficulty will be placed in the way of farmers wishing to remove it from the beach at Grainger's Bay and Three Anchor Bay, so that when the weed is there, no farmers' carts or waggons should return empty to the farm. The obvious difficulty is the fact that it is only irregularly deposited, one storm bringing up hundreds of tons, while another brings nothing, probably due to the set of the tide and currents. Seaweed is usually washed up during the months of June, and from November to February, but as it has to be kept for some time to rot, this is no objection.

Cleaning up Nurseries.

A few nurserymen are "cleaning up" their citrous nurseries by spraying every three weeks with a solution of one pound of soft soap in three gallons of water; this treatment, when thoroughly carried out, prevents scale insects from maturing although already matured females are not prevented from breeding. Other nurserymen have adopted the quicker remedy of fumigating the plants under "box" covers, that is covers of air-tight cloth stretched over a light frame-work. An area six to twelve feet long and three or four rows wide is covered at once. Plenty of room above and around the plants is necessary to ensure a rapid and uniform diffusion of the gas, and when the space covered is over eight feet either way, it appears advisable to start the gas from two dishes, one near the middle of each end. Sometimes, a few scales occur on the stems where they enter the ground, and to make sure of reaching these, the soil should be hoed away from the plants shortly before the treatment.

Deciduous trees may be fumigated in the same manner as citrous trees, and when they are dormant they will withstand very strong gas without injury; immature wood is apt to be scorched.

A number of nurserymen are transplanting their nurseries to new ground and away from the vicinity of older trees. None of these should fail to thoroughly fumigate all the stock before it is replanted. There is no doubt that scale insects and aphides are often brought into nurseries with buds and scions, and the simple precaution of fumigating all the cuttings to be used in propagation will doubtless save much trouble.

Lime-Sulphur Washes for Nursery Stock.

Some pests that are spread with nursery stock do not appear to readily succumb to fumigation. Examples are Bryobia Mite, Red Spider, and Pear Leaf Blister Mite. To check these it may be necessary later on to insist that deciduous nursery stock be sprayed during the late winter with lime-sulphur or lime-sulphur-salt mixture. The safety of using these washes on nursery stock has not been fully demonstrated, and it is suggested that nurserymen acquire experience by treating small blocks of the different kinds of deciduous trees during the present winter. This is desirable because the Transvaal authorities have stated that infestation by the pests named may disqualify stock for shipment to the Transvaal next season. The lime-sulphur solutions are the most efficient known for the suppression of tree mites. They act chiefly on the young and as these may not appear until the foliage is starting and spraying dangerous, the application should be made shortly before the buds break to get the results. The dipping of deciduous nursery stock in lime-sulphur-salt mixture, previous to planting, is said to be a common practice in some parts of America. Fungous diseases are checked by these washes.

Wool Sheep *vs.* Cross-bred Persians.

An O.R.C. correspondent writes: "I am pinning my hopes to Cross-bred Persians. I should very much like you to start a full debate on the pecuniary advantage or disadvantage of Wool Sheep v. Cross Persians. When reasoning with my Boer neighbours they have nothing to say to my arguments. But they nevertheless think the 'Wol-Schaap' pays better. I say 'think,' because they have not tried it on an extensive scale. Another interesting subject is the relative merits of Merino and Rambouillet wool, in different regions and if Merino, the type, Saxony, French, Vermont, Californian or Tasmanian. To mention Shropshires and other breeds would be to extend the subject too far. The level-headed farmers here say though Rambouillet-wool fetches a better price per lb., the merino (?Vermont) wool, despite the 1d., 1½d., or 2d. less obtained, brings in more, and that, in proportion to the grease they are able to put into the wool. 12lbs. at 5d., per lb. equals 5s. whilst 6lbs at 8d. equals 4s. (that is 3d. difference). And speculators who come to buy slaughter sheep, make very little difference, if any, between Rambouillet and Merino (?Vermont) hamels."

The question of "Wool Sheep *vs.* Cross-bred Persians," to use our correspondent's phrase, resolves itself entirely into a matter of conditions and circumstances. It means that in the one case the farmer lays himself out to supply the butcher only, in the other his main crop is wool, plus the mutton. Now which of these two industries may be most profitable could never be settled by discussion or debate, for it is transparent at a glance that one might suit in one set of conditions and be an entire failure in others. However it would be interesting to get some authoritative opinions on the subject, provided the local conditions, distance from markets &c, are fully stated. The wisest farmer is he who decides such questions for himself by first intelligently weighing all the circumstances and then testing his theories by experiment.

The other question as to the most profitable types of merino seems to have given rise to some confusion. It is a common error to suppose that the Tasmanian, the Vermont, the Saxony, Rambouillet, &c., as woolled sheep, are separated in some way. They are all merinos and as such produce merino wool. But, owing to climatic influences and different methods of breeding they are different types of merino. The variations need not be stated here. The calculations as to the value of wool produced seem also a little vague. The questions involved, however, are vital to the sheep-farmer of this country and it is satisfactory to note that they are attracting attention. A sound discussion on the points raised here, conducted by practical sheepmen of experience, should lead to some good. And we welcome the suggestion.

The Potato Tuber Moth.

Complaints are again being received of the damage done by the potato tuber moth and we have been asked for remedies. We can only again quote the preventive measures recommended by Mr. Lounsbury (Govt. Entomologist) in his article on the subject published in the *Agricultural Journal* in 1902. He there says: The principal measures for controlling the ravages of the Potato tuber moth are preventive in character, careful compact "hilling" makes it impossible for both larvæ and moths to find their way to tubers in the ground, whereas careless hilling, especially with lumpy soil, and too shallow planting if flat cultivation is practised, invite infestation. Digging should be commenced without delay when the time comes, and the tubers should be removed from the lands as soon as possible after they are up. The risk of infestation begins as soon as they are exposed and rapidly increases as the sun sinks. If immediate removal is impossible they should be at once bagged and the bags stacked together and closely covered. The store places should be entirely free of old infested potatoes and moths, and to this end should be thoroughly cleaned out before digging time. Having stored the tubers free of the pest in clean surroundings, measures should be taken to prevent moths gaining access to them. Various means are in vogue. Some farmers cover with bagging, others with sand or fine dry earth, others with straw, and still others with straw and bagging. The insect can get from one bag of potatoes to another, so if bagging is used as a cover several thicknesses of good quality stuff should be taken. The infested potato tops, which are recognizable at a glance, may be cut and removed a week or so before digging is commenced, and thus the larvæ, that if they were to remain might get to the dug tubers later, be practically eliminated. Clarke recommends the removal of infested parts of the tops early in the season in order to check the multiplication of the insect.

Ham and Bacon Curing.

J D.M., writing from Post Retief, asks for the best recipe for ham and bacon curing. As the "best" we take to be that of one who successfully uses it in this country, the method supplied by. Mr. W. Frank, of Swellendam, contributed to these pages in Vol· XXIV., seems as good as another. Mr. Frank there laid down his methods as follows:—"After your pig is slaughtered, allow it to become quite cold and set before preparing it for salting. The early morning is best. Then cut off the head, and it is safest to keep it quite apart from the other meat. Next cut down your pig, and separate the legs and shoulders neatly, and laying them upon your salting table, flesh uppermost, take out the blade bones, and sprinkle them over with crushed saltpetre, and then cover up with good clean salt, not too coarse. Treat the sides in the same way. If your thermometer does not show a temperature of, say, 55° Fahr, it is by far the best plan to plunge hams and shoulders into a good strong brine for a few hours to free them from all impurities, especially if you are troubled with hot winds, which prevail along our south coast during June and July. By using these precautions, I have never lost one pound of meat. A pig of, say, 200 lb. weight, can be properly cured on the dry salting system in from 15 to 20 days. For the first few, carefully rub in fresh salt, and see the brine drains nicely away. After the first ten days you can safely turn the hams, flesh down, for a day or two. When thoroughly cured, wash off all salt with cold water, and dust over with pea meal before sending to be smoked. To produce the glossy appearance in smoked hams, rub a little vaseline over the skin. The excessive paleness noticeable in some hams is produced by dipping them into scalding water. In conclusion, as I before observed, cold dry weather and strict cleanliness must be studied to ensure good results upon a farm in this country." The above is what is known as dry-salting.

Mr. Frank says nothing about his methods of smoking, and as the chimney is a little out of date it would be as well to go in for a smoking house which is not very difficult to construct. An Australian writer (Mr. G. Valder) recommends a hut about eight feet square, composed of bush timber, with strong beams across the top to hang the flitch upon. We fear galvanised iron would have to take the place of the bush timber in most parts in this country. The flitches can be hung so close together as not to touch. The roof may be nearly flat, with only a very small opening to let out a portion of the smoke. The floor is then covered over with about six inches of hard wood sawdust (in Australia). And this is lighted at two different sides. It will burn but not cause any flame to injure the bacon. The door must be kept closed. About ten days will be required to properly smoke the bacon, after which it may be packed away in sawdust or bran until required for use. Sugar is now much employed in equal proportions with salt, and its use imparts a fine rich flavour to the meat.

Salt Bush Seed.

Mr. Herbert Alston, of Van Wyk's Vlei, asks us to call attention to the opening of the railway to Pampoenpoort, which is the nearest station now for loading up salt bush seed. The seed can now be delivered at that station for 11/- per bag of 25 lbs., prepaid, which is one shilling less than the former charge to Hutchinson (late Victoria West Road).

The "Eli" Baling Press.

In the June issue we stated that the agency for the "Eli" hay baling press was held by Mr. B. K. Mayo, of Bayville. This, we learn, is an error. The agents for this press are Messrs. Philip Bros., of Port Elizabeth, who carry stocks and can supply full particulars to all who may require them.

Trefoil in Lucerne.

A Bedford correspondent submits for identification a plant called, he believes, English Clover or Wild Cover. It is overrunning a field of lucerne which he has just laid down, and, unless eradicated, will, he is afraid, choke the lucerne. He wants to know whether the plant may be eradicated without ploughing over the whole field. Will constant mowing destroy it; does it grow only from seed, or also, from the old crown? It appears to grow only in winter, and if it only grows from seed he considers it ought to be possible to destroy it by mowing several times in winter.

The specimen submitted is Trefoil, otherwise Nonsuch, Hop Clover, Common Yellow Clover or Black Medick (*Medicago lupilina*). It is a good forage plant, growing in colder climates than those that suit lucerne, that is why it is growing here in the colder season. If lucerne is not growing then there can be no objection to Trefoil giving a winter crop, as it will probably not thrive in the heat of summer. It is a common adulteration in lucerne seed, and that is probably how he has got it into his land. Its presence as seed can only be determined by careful examination, but it is easily found by those who know what to look for. It is a biennial, so that by mowing it before it flowers in two seasons it may be much reduced, but a certain amount is likely to escape the knife, and flower, which it does plentifully, so that it will be hard to entirely eradicate. It is not likely to injure the lucerne, and, though not as valuable a forage plant, it is not to be despised or regarded as a pest.—E. A. N.

Cleanliness in Milking.

A good plan for securing clean water every time a milker washes his hands was described some time back as follows by the *Journal of Agriculture*, Victoria:—"Procure a 5-gall. oil-drum, fitted with a tap, place in a convenient position in the cow-yard, preferably close to the milk-stand, and fill it with clean water. After the milker empties his pail, he goes to the water-can, turns the tap, and washes his hands. The advantage of this system over the use of a bucket or basin is that you get clean water every time, otherwise a number of milkers are likely to wash their hands in the same vessel, and the object aimed at is defeated. When a bucket is used the water soon becomes highly impregnated with filth organisms, and possibly the germs of disease from some cow that may be suffering from sore teats, and may serve as a medium for inoculating disease to the whole of the herd, causing no end of trouble and annoyance afterwards. There is also a consequent loss of milk, as, in the process of milking, the nerves of the teat are acted upon and stimulated to induce milk secretion; but the pain caused by sore teats suspends it almost entirely." The better plan is, of course, to have the water laid on to the milking kraal, but, unfortunately, everyone is not able to do this.

Weather-making a Delusion.

Considerable money and not a little thought and energy have been frittered away in recent years in various parts of the world (says an exchange) in efforts to change weather conditions by the use of high explosives. Extensive experiments in this line were conducted in Kansas and Texas, U.S.A., several seasons ago, the special aim in these being to break a prolonged drought and produce a rainfall by firing off heavy cannon. No valuable results were derived from these tests.

Experiments on a larger and more elaborate scale have been conducted in the wine-growing districts of Italy and France, with a view of preventing hailstorms, by the use of cannon specially contrived for the purpose. The efforts made in this direction in the countries named were successful enough to attract widespread attention in Europe, and led to the calling of a "congress" to discuss the subject and devise measures for the extension of the system of alleged prevention. Professor Willis L. Moore, Acting United States Secretary of Agriculture, issued a statement in regard to the matter.

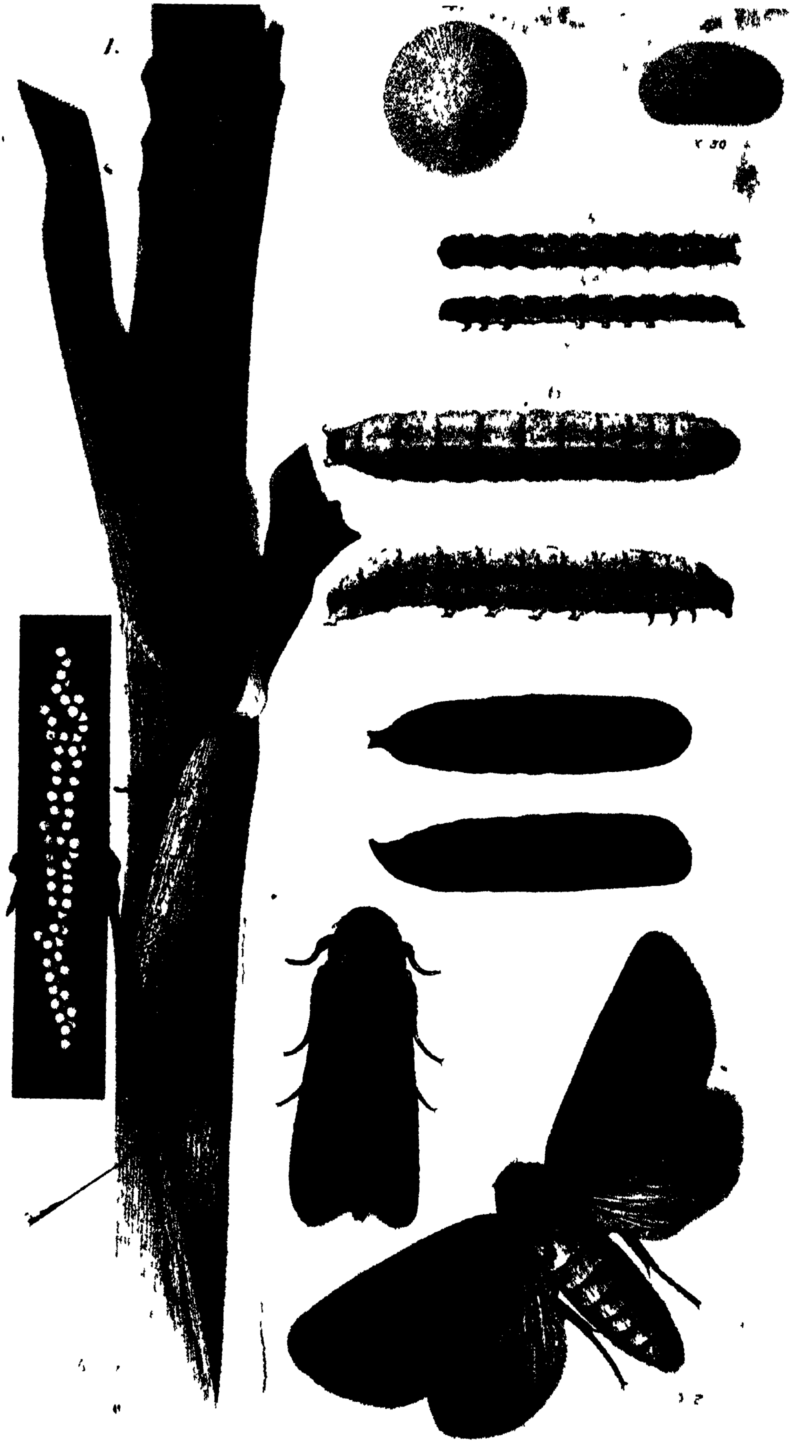
In this he expressed the opinion that the idea of preventing hail-storms or producing rain by the use of explosives is a delusion, and that "efforts should be made to prevent its spread in this country." The energy expended by nature in the production of a storm of any kind ([illegible] Professor Moore) probably exceeds the energy of all the steam engines and cannon in the world, and it is utterly vain and useless to endeavour to combat Nature along these lines. These are the views [illegible] man who has made a life-long study of weather conditions.

Roots for Animals.

The feeding of roots to farm animals is not as general as it should be. Especially is this true of the cow. It has been successfully demonstrated that root feeding exercises a beneficial effect upon the digestive organs, and as a natural consequence the health is improved. As the appetite is increased by their use, the flow of milk is increased correspondingly. By actual experiment (claims an American writer) carrots have been found to be more valuable than turnips. The cost of raising carrots is very little more than that of turnips. Most dairy folks know that in the carrot is found a natural colouring agent, the carrot, especially the yellow variety, producing an increased flow of milk with rich yellow cream. As a fattening agent the carrot is excellent, used in connection with grain, hay, etc. For the purpose of fattening, the white carrot can be used also. Potatoes may be fed in small quantities in rations for cows, but their use should be only occasional, as they tend to soften the butter product.

Salt for Farm Animals.

So essential is the regular and frequent use of salt, for the maintenance of health, that animals, especially vegetable feeders, living in a state of nature, instinctively travel many miles to saline springs, the seashore or to incrusations or beds of salt to get it. It has been noticed that the skin and hair of animals deprived of this necessity become rough and dry. That they do not take on flesh and thrive equally as well as do those having frequent supplies of salt. This has been shewn to be true of horses, cattle, sheep and swine.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THE MEALIE-STALK BORER.

Sesamia fusca, HAMPSON.

BY C. W. MALLY, M. SC., Eastern Province Entomologist.

The Mealie-stalk Borer is a constant factor in the production of mealies not only in the Colony but throughout South Africa, it being perhaps most destructive in Natal. It has been known for so long that many consider it a "necessary evil" and have become indifferent to the loss caused by it. To many farmers the name "Mealie Grub" is more familiar. Others again persistently refer to "Cutworms" as "Mealie Grubs." In Natal it is well known as the "Top Worm." The name Mealie-stalk Borer is preferable because it is descriptive of the habits of the pest in the destructive stage and leaves little chance for confusion.

DESTRUCTIVENESS.

The seasons of 1903-4 and 1904-5 were not favourable to the production of the best crops of mealies in the Eastern Province. Neither has the Stalk Borer been so much in evidence. Hence I am not in a position to estimate the maximum loss due to this insect. Lands which have been under observation during the last two seasons shewed injury to the amount of about 25 per cent. of the young mealies. Many farmers say that during years of serious destructiveness the damage easily amounts to as much as 50 per cent. Mr. Claude Fuller, Natal Government Entomologist, gives a still higher estimate. The estimate of damage usually refers to the destruction of the young mealies. The damage to the older mealies is usually overlooked because they are large enough to cover the ground and in a great measure resist the effect of the borer. While not especially noticeable the borer undoubtedly exerts a decided influence on the quality and weight of the cobs on the infested stalks. But even disregarding the injury to the maturing mealies, it is evident that if

Mealie Stalk Borer.

EXPLANATION OF COLOURED PLATE.—1 Mealie Stalk, natural size, showing eggs laid by moth, under leaf-sheath. 2. Group of eggs removed from beneath sheath, enlarged three times. 3. Opening in stalk through which moth escapes. 4. Single egg from top, magnified thirty times to show ridges on surface. 4a. Same from side. 5. Young larva, magnified twelve times. 5a. Same from side. 6. Full-grown larva, twice natural size. 6a Same, from side. 7. Pupa, twice natural size, back view. 7a Same, side view. 8. Moth, twice natural size, at rest with wings folded. 8a. Same, with wings spread.

the first brood of the borers destroys 25 or 50 per cent. of the young mealies there is only three-fourths or one-half a crop left to repay the farmer for his work. This is an important consideration, for the remaining portion of the crop is scattered about over the whole field and requires as much time and energy for cultivation as would a full crop.

FOOD PLANTS.

Mr. Claude Fuller has recorded the following food plants in Natal;—mealies, kafir corn, geranium (rarely), and probably Theosinthe. In the *Transvaal Agricultural Journal* for January, 1904 it is stated that " the mealie and kafir corn are the principal plant's attacked although other similar plants suffer some injury,"—but no others are mentioned in particular. Here in the Eastern Province it has been found only in mealies and kafir corn.

TWO SPECIES AT WORK

Two species emerged from material collected in the field, the one which is the subject of these notes, and a smaller light coloured one. Their habits are identical with the exception that the light coloured species has three distinct broods in a season and the moths emerge two to three weeks earlier in spring. It passes the winter within the stalks the same as does *Sesamia fusca.* Hence the same methods of treatment will apply to both and therefore reference will be made to only the one species until certain points in the life history of the undetermined species can be cleared up.

LIFE HISTORY—FIRST BROOD.

The Adult.—The adult insect is a moth and measures about three quarters of an inch in length and from one and a quarter to one and a half inches across the expanded wings. The front wings and the body are usually dark brown, but lighter coloured specimens are not uncommon. The hind wings are almost white with a smoky tinge and dark longitudinal lines indicating the veins. The excellent coloured figures (Plate, figures 8 and 8a, twice natural size) by Mr. McManus, conveys a correct conception at a glance and make further description unnecessary.

The majority of the moths emerge during November, but the advance individuals may appear during the last week in October and belated ones as late as the middle of December. If mealie plants are available, the females begin depositing eggs almost immediately, but do not die for about a fortnight, much depending on circumstances.

The Eggs.—The eggs (see Plate, figures 4 and 4a) are small light yellow bodies with distinct ridges at the sides and slightly flattened at the ends. They become distinctly darker as development proceeds. Some that were deposited in the cages hatched in seven, eight and nine days respectively. They are deposited in clusters under the edges of the leaf sheaths and hence are safe from destroying agents. They are faintly visible through the sheath—Plate Fig. 2. The number in a cluster is very variable. In some instances only five or ten are found together. In others over one hundred have been found. From the relative position of the eggs and the variation in the time of hatching, it is very likely that these large clusters were not all deposited by the same moth, for the tension on the sheath produced by the eggs underneath makes it easier for a succeeding moth to oviposit at the same point. Laboratory observations show that the eggs are always deposited at night, the moths hiding away during the day. The method of egg deposition has been confirmed in the field, numerous clusters of eggs having been found under the leaf sheaths of growing mealies and on hatching proved to be identical with larvæ reared in the cages.

The Larva.—The young larvæ or borers do not devour the egg-shell for their first meal,—as is the case in a nearly related species, but begin feeding on the mealie stalk at once, gradually eating their way towards the centre. They are very careful to remain under the sheath all the while, and it affords them perfect protection from rain or insecticides. They are light coloured at first with a dark head and dark markings on the individual body segments. The dark markings become more conspicuous up to the third stage and then gradually become lighter as the larva matures. Different specimens vary considerably in intensity of colour and hence it is difficult to give a hard and fast rule. Figures 5 and 5a of the Plate give a good idea of the shape and colour of the larvæ. Where so many eggs are deposited on the same plant it soon succumbs to the ravages of the larvæ. When the food supply is exhausted they leave and search for fresh plants. This accounts for the fact that so many young larvæ are found together and only comparatively few fully developed larvæ or pupæ in the same plant. While I have never seen them actually crawling about in search of fresh plants in the field, I have several times found a larva that was burrowing into the stalks near the base and had all but disappeared. On examining the plant in detail it was evident that the larva came from some other plant. In the cages they have frequently left an exhausted plant and taken to others alongside. Some of them evidently lost their way and wandered aimlessly about the cage. This might be called a migration enforced by necessity under artificial conditions, but the same necessity exists under natural conditions. I suspect that the larvæ migrate at night. If they migrate during the day birds probably play an important part in reducing their numbers.

The Pupa.—On reaching maturity, about the first week in January, the larva clears out a portion of the burrow, prepares an opening through which the adult can escape (Plate, figure 3), and then transforms to a dark brown pupa, as shewn in figures 7 and 7a. It remains in the pupa stage from a fortnight to three weeks, and then transforms to the dark brown moth described above. After pairing, the female lays eggs and dies, thus marking the end of the first brood.

SECOND BROOD.

The eggs for the second brood are deposited under the edges of the leaf-sheaths, about the first of February, and may be found anywhere from the main stem well up to the tassel, preference apparently being given to the younger portions of the plant. The eggs hatch about the end of the first week in February, and the larvæ burrow into the centre of the stalk as before. They mature by the first of June, depending on the condition of the mealies. They do not transform to pupæ at once, as in the first brood, *but pass the winter as larvæ within the stalks,* occurring anywhere from the cob down to the roots, much depending on the size of the plant. In large mealies and Kafir corn, I have found it to be the exception for the borers to be in the roots. In small stunted mealies and Kafir corn necessity drives them to burrow into the roots for food, and, perhaps, the majority pass their winter there. The cob is sometimes infested, entrance usually being made from the stalk through the pith. In the very late mealies the cobs may be considerably infested, for they then furnish an attractive feeding-place The larvæ of the three-brooded species are more common in the cob than are those of *Sesamia fusca.* When late maturing mealies are gathered and stored, they may be the means of protecting quite a number of larvæ, thus ensuring a certain number of adults in the spring. But if the mealies are shelled during the winter, and the empty cobs used for fuel, no harm will result, provided they are all burned by the middle of September.

Number of Broods.—On page 27 of my report for the half year ended June 30th, 1904, it is stated that "in the coastal belt there are probably three annual broods, provided young mealies are available for the first moths that appear." There is no conclusive evidence on this point, but in the vicinity of Grahamstown there are only two well-defined broods in the season. In the cages only two moths emerged in time for a possible third brood (latter part of April). One was dead when found, and there being no chance for the other to pair, the eggs did not hatch. All the pupæ found in the field at this time proved to be those of the three-brooded species. If occasional specimens do emerge out of time in the field, there is very little chance of their mating. No third brood larvæ were found.

In a climate like this we must expect irregularity in the development of the individuals constituting any given brood, perhaps depending most largely on the succulence of the different mealie plants, so that there is a tendency for the two broods to overlap. Some of the belated larvæ no doubt feed to some extent on the pith in spring, but there is no indication that they leave the stalk in which they passed the winter.

EFFECT ON THE PLANT.

The first evidence of the presence of the borers is withering of the top of the young plant, which turns a brownish-red colour, as if scorched, due to the fact that the centre or "heart" has been eaten away. Although the centre of the plant has been destroyed, the outer leaves and roots do not always perish, but make an effort to recover. The leaves may become somewhat darker than in surrounding plants, and in some cases "suckers" are thrown out later, so that in time the plant fills its place in the field. All such plants must be counted as loss, for they seldom or never produce cobs. Their only value is for ensilage or for feeding green to stock. The second brood does not exert such a decided influence, because the plant is then strong enough to resist the attack, for the burrows are not sufficiently large to prevent the flow of sap.

CONTROI MEASURES.

From the brief sketch of the life history of this insect, it is apparent that there is no hope of destroying it during the summer by the use of insecticides, because all its transformations take place within the plant, and the moth itself is protected through being nocturnal. It has been suggested in Natal that a poisonous mixture poured into the top of the plant, might be successful. The results with the few plants tried were negative, because the leaf-sheaths fit so closely and the plant is so formed that it sheds anything poured in at the top.

Our main hope lies in the possibility of establishing a system of cultural methods which will enable us to *prevent* injury. Work was accordingly undertaken to demonstrate primarily whether or not the pest could be controlled at all. With that point settled, it will be comparatively easy to determine which of several methods will give the best results in practice.

Burning the Stalks.—The fact that the winter stage of the insect is passed within the remains of its food-plant is its weak point, and gives a control measure in the destruction of the over-wintered stalks which, if carefully followed, makes it possible to prevent appreciable loss, The advisability of burning the stalks has often been suggested and it was therefore decided to concentrate the initial work on the practicability of this measure.

When the stalks have been left to dry up in the field they are of little value except as "stalk-pasture" for cattle and horses. Since the moths do not emerge till spring it is an advantage to use the stalks for pasture for it reduces the bulk to be handled in burning them. Their value as a source of plant food in the soil must not be overlooked, but there is also the disadvantage that coarse material tends to augment the effect of drought in certain soils. The stalks are not lost by burning, for the ashes remain and are readily available. From the standpoint of value as stock food or fertilizer the stalks can easily be turned to better advantage by means of the silo or cutting them in time for "fodder," as pointed out later, and ultimately returning them to the land as manure.

The co-operation of the farmers in the Collingham Valley, near Grahamstown, was secured with a view to demonstrating the value of stalk-burning. This group of farms is well suited to a test of this kind for, although they are not large, they are protected from outside infection by means of natural barriers. Hence a thorough destruction of the over-wintered stalks should give a decisive result. The stalks were accordingly cleared out throughout the valley during August, 1904, and the planting of the mealies left to be done in the usual way and at whatever time seemed advisable to each farmer. The destruction of the stalks was thus the only departure from the usual routine. The stalks were pulled out, or hoed out where the ground was too hard for pulling, piled up in convenient heaps and burned, especial care being given to the heating of the stumps that were near the edges of the heap. It is not sufficient to let the fire sweep through the heap and then gradually smoulder away. The stalks and stumps around the edges must be raked up on to the centre of the burning mass, otherwise a few borers will remain alive.

In two small lands stunted Kaffir corn and mealies were smothered in couch grass. As pointed out above, in such cases the borers are largely found in the roots. It was very difficult to get the boys to hunt out all the roots and some borers were certainly missed in this material. On the properly cultivated lands the destruction was practically complete. Most of the planting was done during October, but some not till November. The lands were kept under observation throughout the season.

The first brood of borers was very scarce indeed. Along one side of an acre or two of mealies planted very early (latter part of September) perhaps five per cent. of the plants were found to be infested during the first week in December. This was due to a small patch of mealie stalks in the grass and bush in a ravine near by which had been missed in August, and not destroyed till about the first of November. Strangely enough the infection was limited to a very small portion of the land. The mealies were somewhat better there than on the remaining portion. On inquiry it was found that the first cultivation had been interrupted and not completed till some time later. This strip had therefore received an early cultivation which the remainder had not and hence these mealies, being larger and free from weeds, served as a trap for the few moths that escaped. The infested plants were carefully collected and fed to the cattle so as to avoid further confusion.

The mealie stalks remaining in the lands at the close of the season were carefully examined during the latter part of June and the first week in July, 1905. A small number of larvæ were found but they can only be designated as a trace. In the Kaffir corn and mealies that were planted near the couch-grass sod previously mentioned, the infestation amounted to scarcely three per cent., but in one small bit of Kaffir corn (a few square roods in extent), evidently planted later than the rest, the infestation, due almost entirely to the last brood of the three-brooded species, was under ten per cent. Being greener than the rest it had evidently served as a trap for the moths from the older mealies and hence the infestation was relatively greater.

The result of the work as a whole is very encouraging, especially when it is remembered that the sources of infection were such as could scarcely be eliminated the first season. There is a distinct advantage in the fact that the work of clearing the mealies can be done during the slack season thus relieving the question of labour and leaving the farmer perfectly free to plough and plant whenever conditions seem most favourable. There need then be no uneasiness in regard to early planting. In an average season I believe early planting will show an additional advantage in that the mealies will be large enough to be out of the way of the spring brood of cutworms which frequently do such great damage.

It must be clearly understood that half-hearted work is of little use. The occasional stalks and stumps, which it seems hardly worth the trouble to clear up, may harbour enough borers to discredit the work when the young mealies are examined in the spring. The same is true of neglected spots or lands to be left fallow for the season. Neglect is the strongest ally of the pests, for it provides them with a good base of supplies on which to gain strength for the next season's depredations.

Two other sources of infection might easily be overlooked. By mere chance it was noticed that a native had used mealie stalks in thatching a hut scarcely 200 yards away from a small land of mealies. No reliable evidence of infection from this source was found. On two of the farms a considerable quantity of mealie cobs had been stored. They were close to mealie lands, but there was no evidence that they were a serious drawback. If they come from late maturing mealies, they may be a more potent source of danger. With proper attention to cultural methods, these factors will be eliminated the first season.

Ploughing the Stalks under.—It is frequently suggested that ploughing the stalks under would be sufficient. Work was started along that line, but it was discontinued as an initial demonstration, because so many plausible excuses could be made for unsatisfactory results. The chief difficulty was to get the stalks properly covered. An attempt was made to have the projecting stalks pulled out and placed flat in the furrow, but we soon found that by pulling out one stalk we partly uncovered another. Others were so near the surface that they were pulled out by the harrow, making it necessary to collect and burn them later on. The uncertainty of the rains must also be taken into account. During the autumn and winter of 1903 the ground was so dry and hard that ploughing was out of the question. When the rains came there was a great rush to get the ground ploughed and the mealies planted, so as to get the benefit of the rains. That was quite right, for a delay of even a few days or a week makes a great difference in the start given the young mealies. This season, 1905, the rains came so that the farmers could plough during June for forage. Stalks that were well covered at that time will no doubt decay, and the contained larvæ perish. But the stalks left on the surface must be burned by the middle of September, or a sufficient number of moths may emerge to cause considerable injury to the mealies later on. So much depends on circumstances that each farmer must decide for himself in regard to the advisability of departing from practice which has been found satisfactory.

Late Planting.—If the moths all emerged about the same time it would be an easy matter to plant the mealies late enough to escape the deposition of the eggs for the first brood. Since emergence covers a period of a month or six weeks, this measure is of doubtful utility. Late planted mealies are in the best condition for the second brood of borers, and insure a supply to pass the winter. Here again the rains play an important part. To miss planting when the rains come during September and October very likely means a greatly reduced crop. This was strikingly illustrated on one farm the past season. The mealies that were planted early made a fairly good shewing, but those planted a month later scarcely came through the ground for another month, made a very different growth, and finally succumbed to the drought. In view of the uncertainty and the loss which is liable to result from long delay, it is hardly advisable to urge the adoption of this method. It is open to the additional objection that the mealies will, in all probability, be up in nice condition for the spring brood of cutworms, so that what is saved from the stalk borer will be more than counterbalanced by them.

Collecting Infested Plants.—This was tried in a small way as supplementary to the burning of the stalks. It answered very well for the small area under treatment, but I am unable to say how it would do for extensive lands. I fear it would prove to be rather troublesome, for it would have to be done at a time when there is a great deal of other work, and the land would probably have to be gone over several times on account of the irregularity in the hatching of the eggs. Simply hoeing or pulling out at thinning time will not answer, for they will soon find their way to fresh plants and continue as before. The infested plants must be destroyed.

Trap Mealies.—A few rows of mealies planted very early would render good service by attracting the moths so that the eggs for the first brood would be deposited on these few rows. It would be an easy matter to go over them, say once a week, to destroy the plants shewing signs of withering. A case in point is recorded under the heading "burning of stalks" where all of the eggs were depositod on the narrow strip which had received the extra cultivation. An early variety of mealies is preferable for this purpose because it tends to grow more rapidly and so augments the effects of early planting. It must be remembered, however, that unless the trap mealies are looked after carefully, they are a positive injury because they will be the means of saving the eggs from the earliest moths and insure the greatest possible number of the first brood coming to maturity.

The Silo.—For either ensilage or fodder the mealies could be cut some time before the second brood of larvæ has matured. Although no test has been made, it is difficult to see how they could survive in the silo. They survive without difficulty in mealies cut and dried in the ordinary way for "fodder," but they would stand little chance of escaping the shredder. In case the fodder was used without shredding, the coarse stalks should be collected and burned before the middle of September to prevent the escape of moths from larvæ that are not destroyed in tramping.

The question of ensilage and fodder as preventive measures raises the whole problem of how best to utilize the mealie crop when once it has been produced. A great many possibilities suggest themselves in this connection, but it would be futile to discuss them at length, for there is not much chance of getting satisfactory information in regard to them until we have experiment farms on which proper investigations can be carried on. For the present we must be content to follow the methods which promise the greatest measure of success under existing conditions.

Co-operation.—The question of co-operation is the great stumbling block in dealing with insect pests, but in this instance I do not believe it is altogether essential unless the lands in question are practically adjoining. Observations on the farms under control last season lead me to believe that the moths do not travel far in search of food plants and that they are content to stay in the first mealies they find. Trap mealies could be used to good advantage between the lands to be protected and the source of infection.

NATURAL ENEMIES.

Parasites.—Two distinct species of parasites were reared from the larvæ and a third from the pupae, during the season of 1903-4. An additional species of parasite was reared from the pupæ of the first brood 1904-5, but there was no trace of the species found the preceding season. None of them have emerged from over-wintered material. If this proves to be the rule, then any measures adopted for the destruction of the over-wintered larvæ will have the additional advantage that the natural enemies will have to concentrate their efforts on the progeny of the moths from the larvæ that escape destruction. On the other hand, it may so reduce the food supply for the parasites that they will die off from starvation. Be that as it may, we must be guided by the fact that, being indigenous, they are no doubt working to their utmost capacity. While they do some good, they have not shewn themselves able to keep the pest under control. Hence we are forced to adopt artificial means to avoid serious loss. A dipterous larvæ has several times been found feeding on partly decayed stalk borers. Some were isolated on decaying material from the burrows and they developed without difficulty, evidently playing the part of scavengers.

Ants.—On one occasion Mr. S. M. Wood found that ants had entered the burrow and were attacking the borer. This ant is often found hollowing out the pith of certain plants and it is likely that they were trying to expel the borer so as to have the burrow to themselves.

SUMMARY.

The life history of the Mealie-stalk Borer has been traced at Grahamstown during 1904-5. Its food plants are practically limited to mealies and kaffir corn. There are two broods during the season, the first being the most destructive because the plants are so small.

All its transformations take place within the plant, thus leaving no chance of destroying it by means of insecticides.

Its natural enemies are not able to cope with it.

The fact that it spends the winter as a larva within the stalk makes it possible to control it by cultural methods, especially burning the stalks during August or not later than the middle of September. Further tests are necessary to determine the value of other control measures.

Where the stalks have not already been destroyed no time should be lost in clearing them out for the present season.

ACKNOWLEDGMENTS.

It gives me pleasure to express my sincere thanks to Messrs. Herbert Wallace, R. C. Hoole, W. H. Barnes and Stanley Dold, of Collingham. for their hearty co-operation in the work of testing the value of burning the stalks as a control measure for the Mealie-stalk Borer. They not only gave me a free hand on their farms but assisted in every way possible in carrying on the work. I am also under obligations to Mr. R. H. Lloyd, in charge of Mr. W. H. Barnes's farm "Bluegums," Collingham, and to Mr. Glanville, then in charge of "Upper Gletwyn," near Collingham, for their hearty co-operation at all times during the progress of the work.

FUSICLADIUM OF THE APPLE AND PEAR.

BLACK SPOT, SCAB, CRACKING, OR SCURF.

BY CHAS. P. LOUNSBURY, GOVERNMENT ENTOMOLOGIST.

The subject of these notes is a fungous disease that was a topic for serious discussion and urgent resolutions at meetings of a number of fruit growers' associations during the past season. The matter was also discussed at the last annual conference of fruit growers at Oudtshoorn and at more than one recent meeting of the Western Province Board of Horticulture. Why so much prominence has been attracted to it all of a sudden, is not for me to question at present. But a false impression now prevails amongst fruit growers that the colony is threatened with the introduction of a new and terrible fruit scourge which the Government knows nothing about and has taken no steps to keep out, and which is a constant accompaniment to shoals of Australian apples flooding the markets; and I deem it a duty to allay the consequent anxiety by publishing a plain statement of the actual facts of the position. No originality for any of the information concerning the disease is claimed.

WHAT FUSICLADIUM IS.

The term "Fusicladium" has been uniformly employed for many years in our Departmental publications as the designation for the disease. The Australian name "Black Spot", the American "Scab", and the others cited in the heading are less desirable because by their descriptive character they lead to the confusion of the disease with other troubles. The fungus attacks the fruit, leaves, and young bark of apple and pear trees. Upon the fruit it forms dark, nearly circular spots, which extend until generally at least a quarter-inch and sometimes a half-inch in diameter. Several spots may meet and thus one great irregular blotch be produced. The centre of a spot is dark brown or black, and the edges pale. The fungous growth is seldom more than skin deep; but when it is extensive, deep cracking is liable to take place. Growth is checked in the diseased portions, and hence if attacked when young, the fruit is likely to become distorted in shape. Affected fruit when pared is as healthful as sound fruit, but because of its bad appearance its market value is considerably less. On the leaves the fungus forms velvety, greenish-black or brownish-black spots, between an eighth and a half inch across, and generally on the upper surface. The leaves become distorted, and broken at the edges, and when much of their area is affected often drop; sometimes whole orchards are thus defoliated. Ordinarily the crop is not much decreased in extent even when its commercial value is greatly reduced; but under some circumstances the entire crop may be completely lost by falling before it is of any value.

Some botanists consider Fusicladium of the apple (*Fusicladium dentriticum*) specifically identical with Fusicladium of the pear (*F. pyrinum*). Other botanists are equally certain that the two are distinct. As the question is not likely to be settled to the satisfaction of all authorities one way or the other, the only safe policy for the orchardist is to take such measures as would be advisable in either case. The same or a similar fungus is known on native plants allied to the apple and pear in America.

WHERE FUSICLADIUM OCCURS.

Most writers on the subject state in effect that Fusicladium is co-extensive with the fruit trees which it attacks, or modify such a statement with a remark from which one must draw the inference that where it is supposed to be non-existent, it probably has never been properly searched for by a competent botanist. For a half century or more it has been well known in Great Britain and Europe, and long ago it was said that almost to a certainty every orchard in the eastern United States, and probably most in the western, were infected. Its occurrence in Australia is said to date back forty years. When recently in the Argentine, I was told it was found on both apple and pear in that country; and so far as the pear is concerned it certainly has occurred about Cape Town for a good many years.

EXTENT OF DAMAGE IN DIFFERENT COUNTRIES.

The extent of damage done by Fusicladium varies greatly with climatic conditions, and for this reason it may be widespread in a country without its presence being recognised. It is generally considered the most serious fungus disease of both the pear and the apple; but to such an extent does its development depend upon favourable atmospheric conditions that "some years the injury may be so slight that it is scarcely noticed, and during others it may attack a tree with such intensity that there is scarcely enough fruit or foliage left to tell the cause of the destruction."—(Lodeman, writing in regard to apples in America) Cool, moist weather favours development, and hot, dry weather retards or altogether prevents it; this fact is well established by reliable observations in many countries.

In the eastern United States and eastern Canada, the climate is such that there is usually considerable damage from the disease, and now and then injury to practically all of the fruit in the majority of unsprayed apple and pear orchards. In California it is said that pears are little reduced in quantity, but that through a reduction in their quality the loss in marketable value is so great that the disease is of serious importance; this loss is estimated to be as high as fifty per cent in some seasons.

The losses in the Australasian colonies, as elsewhere, vary with the climate and with the season. Some months ago the Cape Department of Agriculture addressed enquiries to the agricultural departments of all asking for information in regard to the disease. The essence of the replies is:

FROM TASMANIA.—"It is certainly a serious pest in Tasmania, but it is readily controlled by Bordeaux Mixture."

FROM NEW ZEALAND.—Reference was made to a leaflet, in which it is stated that the disease causes "much loss to fruit-growers. In some cases the fruit in the orchard is entirely destroyed, and the trees have a scorched appearance..........Luckily the disease is easily fought if proper care is taken. Usually two sprayings with Bordeaux Mixture will prove sufficient."

FROM SOUTH AUSTRALIA.—"These fungi (apple and pear Fusicladium) are spread world-wide .... I shall indeed be surprised to hear that they are absent from South African orchards. The injuriousness of the attacks varies with the prevailing humidity of the atmosphere, and this more particularly at the time of the setting of the fruits and for a few weeks subsequently. Here in elevated moist districts (23 to 40 inches of rainfall per annum) it requires careful treatment to avoid loss, but in the open, drier localities (18 to 22 inches per annum) precautionary measures are seldom resorted to............ By spraying with Bordeaux Mixture ...., first when the petals begin to open, and, if necessary, again when the fruits are as large as grape berries, our growers obtain fully 95 per cent. of sound and clean fruit."

FROM VICTORIA.—The disease "is found in some of our orchards in the southern portion of the State, but it is easily kept under control by the use of fungicides."

FROM NEW SOUTH WALES.—"In our moist districts, when the seasons are wet and cold about the time the fruit is setting, which only happens occasionally, ... some varieties of apples show considerable signs of scab, ... During ordinary years, however, we are not much troubled with it, and in travelling through our fruit-growing districts it would be hard indeed to find many apples and pears affected."

FROM QUEENSLAND.—"This apple and pear tree affection has hitherto occurred but locally and in a very mild state in Queensland; moreover, I am not in a position to affirm that it is now even present therein."

AND FROM WESTERN AUSTRALIA.—"This disease is known in this as well as the other States .... On account of the comparative dryness of the air in this State during the growing months, the fungus is not so troublesome with us as it is reported to be in Tasmania and in the other Australian States."

HOW FUSICLADIUM SPREADS.

The velvet-like growth on the black spots indicative of the disease consists of numerous erect threads, at the end of which are born reproductive bodies termed spores. The spores are very easily detached, and become widely scattered in one way or another; they germinate in a few hours when exposed to warmth and moisture or even to moisture-laden air, and are capable of starting a new growth of the fungus. It is obvious that infection is carried from one country to another with fruit spotted by the disease; and equally true that the disease *may* be started in a new locality from such fruit. But mark that "may" in this statement is italicised, for it is extremely improbable that the disease is often introduced in the manner implied. The nature of the spores is to germinate as soon as they are moistened: and their mission appears to be to rapidly propagate the fungus whilst the conditions for its development are favourable, not to hold it over from year to year or to transport it to new areas. It is now thought by plant pathologists that not even the dormant fungus in the fallen leaves has much to do with starting the disease in an orchard in the spring, the outbreak generally, if not practically always, spreading from fungus that has lived over winter on the twigs. It is undoubtedly infected nursery stock, not fruit, that carries the disease from country to country. But so innumerable are the spores, and so diverse and uncontrollable the accidental means that may spread them about, that in a season which is favourable for the fungus the disease may rapidly pass from orchard to orchard; and thus, quite unaided by human agencies, become rapidly established over great areas. The wind is probably by far the most important factor in this local spread of the disease.

PRESENCE IN CAPE COLONY.

Fusicladium of the pear must be very widespread in the Cape Colony. I have not recorded where I have come across it as I would have done were it an insect pest, but I have seen it in many widely separated sections. It certainly occurs in most, if not all the towns in the south-western fruit districts; and it has been reported to me from several eastern places. I remember that the matter was informally discussed at a meeting of the Eastern Province Board of Horticulture before the war, late in 1898 I think, and that a number of members stated that they knew the disease. Professor MacOwan, the late Government Botanist, had infected fruit sent to him in 1889; and at the time he published an article on the disease in the *Agricultural Journal.* Infested fruit was sent to me from the Cathcart district about six years ago; since, the owner of the orchards has reported that he has found Bordeaux Mixture, then recommended, a most satisfactory remedy. From contact with fruit growers during the ten years I have been in the country, I have acquired the impression that the disease has surely been here for twenty to thirty years, and that it has never done much damage and is never likely to do much in the south-western districts to any but the earliest flowering varieties. The "Saffraan" variety is particularly subject to attack, and, since the advent of the disease, has become so unprofitable that it has passed out of cultivation on many farms. The damage is mostly done late in September and in

October, and I have noticed that even with the Saffraan there is little or no development of the fungus during the summer. Early in the spring there is usually a succession of drizzling rains, and low temperatures prevail at night. The Saffraan then starts into growth, but most other pears and practically all of the apples remain dormant until the middle of October or later. I recall having seen Fusicladium on the Saffraan at Stellenbosch as early as September 20th one year.

I cannot state with certainty whether or not Fusicladium occurs on the apple in the Colony. In the article alluded to above, Professor MacOwan says that he has occasionally seen it; but on enquiring of him recently I found that he had quite forgotten the occurrence and that he could not recall having confirmed his observations by microscopic examination. When I was new to the Colony, I saw what I took to be spots caused by the disease on apples at Newlands and Constantia in the Cape Division for two or three years in succession, but if I examined sections under the microscope I failed to record the fact. I clearly remember that I saw the spots late in the season and that they appeared typical of injury done early in the growth of the fruit. Such spots are brown, not black, and the fruit is often malformed. At the time I took it for granted that Fusicladium was established throughout the country as it was known to be in other countries, and that it escaped observation because the climatic conditions were so unsuitable for it that it did no appreciable injury. The two orchards where I saw what I believe to have been the disease lie against Table Mountain and get an unusually heavy rainfall. If one refers to the "Spray Calendar" issued in 1896, he will see that I there listed Fusicladium amongst the diseases of the apple, and in the "Remedies" sheet published last year the disease is also included, but with the remark that it is not common. Now that special attention is directed to the disease, and that the Department has no specialist in botany or plant diseases, I shall have observations made during the coming season with the view of authoritatively determining whether or not it occurs in the Colony. Of course, if Fusicladium of the apple is identical with Fusicladium of the pear, as Professor MacOwan and many other good botanists believe, we have it widespread; but I take the precaution of assuming that there are two species.

IMPORTATION OF APPLES.

After the foregoing paragraphs, there is little need for me to remark that I do not believe the importation of apple fruits places us in danger of the disease. But it must not be supposed that we admit grossly infected fruit. Every consignment for years has been inspected on arrival, and our actions have the effect of restricting importations to the better grades. Owing to a vague rumour that large quantities of Australian apples were to be shipped to South Africa this season, the Agricultural Department at my request some time ago cabled the Australian Federal Government that apples infected with this disease or other pests were liable to confiscation at our ports. A letter has been received in reply, stating that our warning has been given due publicity. The receipts of apples thus far this year have not been heavy; and the disease has been observed on only a very small proportion of the fruits, and then only to a slight extent. Most consignments have appeared perfectly free of the trouble. The inspectors were lately directed to pay particular attention to the disease, and to refer to this office for special instructions when infected consignments arrive.

Infected consignments must be excluded or admitted without treatment. There is no middle course. To confiscate because a small percentage of the fruits show a few small spots of the fungus, I believe to be utterly unjustifiable; and I am acting on the principle that what is obviously packed as first class fruit should be admitted. It is practically unavoidable that a blemish such as a fungus spot should occasionally escape the notice of a packer. Moreover it is well known that Fusicaldium may develop on apples in storage; and many of the spots on Australian and Canadian apples when they arrived here have been fresh in appearance and may have developed after the fruit was graded.

Were we free of the disease, we would be infinitely more likely to introduce it with nursery stock than with fruit. Our regulations prohibit the introduction of apple trees ready for orchard planting, but admit of unlimited introductions of apple seedlings and "blight proof stocks" for budding and grafting purposes. The nursery stock goes into the country and infection brought with it has a good chance to propagate when the climate is favourable. The fruits are nearly all consumed in the towns. The apples from Australia reach Cape Town in the rainy season and the probabilities are that Fusicladium spores brought with them germinate very soon and perish. The apples from other countries come chiefly for the Christmas trade long after the fungus stands a chance of finding atmospheric conditions suitable to it.

REMEDIES.

As stated in the extracts of the letters received from the different Australasian colonies, Bordeaux Mixture is an effective remedy for Fusicladium. An application should be made shortly before the buds burst in the spring. If the season is favourable for the fungus, a second application should follow about ten days later when the buds are bursting. Later applications may be desirable in some seasons. Lime-sulphur-salt Wash, applied in the winter, is said to check this disease as it does Peach Leaf Curl and Shot Hole Fungus; but mid-winter applications are likely to prove unsatisfactory. Directions for preparing the sprays are given in the "Remedies" sheet, procurable from the Department of Agriculture.

EXTRA TROPICAL FORESTRY.

Being Notes on Timber and other Trees cultivated in South Africa and in the Extra-Tropical Forests of other Countries.

BY D. E. HUTCHINS, F. R. Met. Soc., Conservator of Forests, Cape Town.

(*Continued from page* 77.)

(11) NATAL COAST AND SEMI-TROPICAL.

Semi-tropical coast rainfall about 40 *inches, St. John's to Durban, Delagoa Bay, and northwards to the tropic of Capricorn.*

T. R. Sim, in his admirable monograph on the Egosa forest and its trees (Botanical Observations on Forests of East Pondoland), states: "The average rainfall, well distributed over the year, is about 46 inches during 110 days, and the mean temperature (8 a.m.) 68 degrees Fahr. Further north the rainfall is confined almost entirely to the summer season—November to April.

Fourcade states the mean temperature of Durban at 70 degrees Fahr. The mean rainfall at Durban 1866—1901 is 41 inches. Though these are high mean temperatures, they are yet as far removed from tropical temperatures as is the mean temperature of Cape Town from the mean temperature of the south of England. Thus, the mean temperature of Madras is 82° Fah. and in most tropical places it is upwards of 80°. Loomis states the mean temperature of the Niger country, Africa, at 85°, and Kouka, Central Africa, at 84°, and the Cobing Peninsula, North Australia, at 83°.

There is still in the semi-tropics a well-marked summer and winter; the winter generally healthy and pleasant to Europeans, the summer hot, steamy and often very malarious. The semi-tropics, in fact, as the name well expresses, is on the borderland between the two very distinct types of climate—the tropical and the extra-tropical. The tropical climate shifts down with the sun in summer and retreats with the sun in winter.

It is a summer rainfall area. Usually, too, the rains are less in amount, and are less regular, than in the tropics.

We see the counterpart of the South African semi-tropical region in North-east Australia south of the tropics. The reproduc- in South Africa of the rich forest vegetation of the Australian so-called "Brush" and "Scrub" country is but a matter of planting.

The Red Cedar (*Cedrela toona*) is here still the most valuable species. The Camphor tree grows luxuriantly. The tree-planter has further the huge South Brazilian forest region to draw upon, and the semi-tropics throughout the world, including the lower slopes of the Himalayas. Of the semi-tropical Himalayan trees, Tùn Sisu and Sàl deserve particular notice. Tùn is the same as the Australian Red Cedar, the most valuable tree in all the Australian Forest Flora. Sisu is also a particularly good timber. It is not much heavier than Teak, very strong, elastic and fairly durable. It is easily propagated from seed or cuttings. Sàl is the most important Indian timber tree after Teak, but it is very difficult to get good seed of it—see also the list below.

It is quite impossible to attempt to enumerate the valuable trees of this region. The following, however, may be mentioned as especially deserving of attention :—

The Pitch-pine, *Pinus australis*, and the three other Pitch-pines of the Southern U.S.A., see below in the body of this work.—*P. mitis*, *P. cubensis* and *P. taeda*.

Pinus massoniana and its ally *Pinus thunbergii*, which have rendered such good service in Hong Kong and South Japan. There is a good specimen of the former in the Durban Botanic Gardens.

Pinus khasya, Khasya pine. This pine ranges from a quite extra-tropical habitat of 10,000 ft. elevation ("Burmah" by Ferrars) down to the tropics of Burmah and Assam, whence seed could be easily obtained for cultivation in the semi-tropics of South Africa. It furnishes a sound pine timber weighing 37 lbs. the cubic foot, and with transverse strength 522 (Gamble). It has a good natural reproduction, and forms pure forest extending over hundreds of square miles. This being an extra-tropical, as well as a tropical, tree will be found described in the body of the work.

Pinus merkusii. The semi-tropical pine of the Shan States of Burmah, extending into the tropics of Borneo, Sumatra and the Philipines. There is some doubt, and it is an interesting point with regard to the distribution of the pines, whether this pine extends into the extra-tropics. Dr. Maxwell T. Masters (General View of the Genus *Pinus*) states that "it is said to occur at elevations of from 1,700 to 5,000 ft. in the Shan States." But Gamble in his second edition of "Indian Timbers," published in 1902, gives its upper limit in the Shan States as 3,500 ft. Pending further information as to the cool limits of its habitat, I have described it under extra-tropical trees in the body of this work. The pines of Mexico and Guatamala, such as *Pinus leiophylla* and *P. filifolia*, which extend into the semi-tropics, need scarcely be mentioned here. They do not appear to range to elevations sufficiently low for this region. In the Durban Botanic Gardens are two pines of unknown species.

The *Araucarias* are perhaps, amongst Conifers, the trees which will give the best return in the semi-tropical Natal coast. In the Natal *Agricultural Journal* for 1903 will be found an article by Mr. T. R. Sim, Conservator of Forests, Natal, giving particulars of the growth of *Araucarias*, and recommending their more extended planting. Writing to me a few days ago, he says: "The *Araucarias* do well on the coast, especially *A. cookii,* and I have planted a few thousands at Empangani, also a smaller lot of *A. cunninghamii* *A. excelsa* does about as well, but plants are scarcer. *A. bidwilli* does better in the Yellowwood belt."

Sir J. Liege Hulett, a public man of eminence and a successful planter of tea and sugar in Northern Natal, believes in the *Araucarias* as among the most useful of timber trees for that country. He has planted extensive avenues of *Araucarias* through his tea estates. In his opinion, *A. cookii* is the best suited to that country. Not only does it grow well, but it stands wind. It grew 100 feet in height and 2 feet 3 inches in diameter in 36 years in the Durban Botanic Gardens. Sir Liege Hulett's tea estates lie at an elevation of 1,000 feet above sea-level. *A. cunninghamii* shows a good growth, but is liable to be taken by white ants In the Durban Botanic Gardens it grew 90 feet in height and 22 inches in diameter in 36 years. *A. bidwilli* I noted as doing particularly well in the middle districts of Natal. But nearer the coast, according to Sir Liege Hulett, it will not stand wind; and, if grown in exposed situations, rapidly becomes stunted by the wind. In a sheltered spot he finds its growth is equal to that of *A. cookii.* A tree in the Durban Botanic Gardens, 36 years old, is 60 feet in height and 2 feet 4 inches in diameter. *A. excelsa* grows nearly as well as *A. cookii,* and bears wind well. In the Durban Botanic Gardens it grew 80 feet in height and 15 inches in diameter in 36 years. Sir Liege Hulett thinks further that he has evidence of hybridizing amongst the *Araucarias,* some of his young plants showing distinct characteristics of two species.

There are several semi-tropical Cypresses and Junipers, amongst which may be noted :—

Cupressus lusitanica
,, *sempervirens*
Juniperus bermudiana
,, *virginiana of Florida* (not *J. scopulorum* formerly termed *J. virginiana*).

The Kilimanjaro Juniper, *Juniperus brevifolia* of the Azores and *Callitris whytei* should be tried on damp misty coast mountains.

Grevillea robusta grows to a magnificent tree in the semi-tropics in the Ceylon Tea Estates for instance.

Of the thirteen Australian *Callitrises* there are four semi-tropical species in the Australian list below. Of these *Callitris robusta,* White pine (from the whitish foliage) is that which has the best name as a useful tree in Australia. It covers huge areas of dry sandy land in the interior, but extends to the coast in Queensland. Trees up to 100 feet in height are known. In the Durban Botanic Gardens it grew 17 feet in height and 4 ins. in diameter in 11 years. *Callitris calcarata,* Black pine, is the most beautifully marked: in this respect resembling South African Stinkwood. *C. macleyana* is a coast tree with little figure in the timber. It is found on the coast sands and coast mountains. *Callitris columellaris* grows also on coast dunes. It occupies large areas on the semi-tropical coast of Queensland.

The Australian *Callitrises* are small slow-growing timber trees, very liable to run to dense scrub in the interior, with certain pronounced good and bad qualities.

All these Cypresses, Junipers and most of the *Callitrises* yield Cedar or cedar-like timbers. Also yielding Cedar, and growing more quickly and to a larger size, are the various species of *Cedrelo*, of which *Cedrela toona* mentioned above is the best known :—

Cedrela angustifolia, from Peru
„ *bogotensis*
„ *febrifuga* (allied to *C. toona*)
„ *fissilis*, a large tree in semi-tropical South America
Cedrela glabra.—Nepal, allied to *C. toona*
„ *quianensis* furnishes Surinam Cedar of Central America.
„ *hirsuta*, a scarce tree of Himalayan valleys.
„ *inodora*.—Java.
„ *microcarpa*, wetter semi-tropics of India, north and south.
„ *montana*
„ *odorata*.—Already doing well at Kearsney, northern coast Natal, and in Durban Botanic Gardens, where it grew 66 feet in height and 2 feet 3 ins. in diameter in 34 years.
„ *paraguensis*.—A large valuable timber tree.
„ *serrata*.—Drier semi-tropics of India, very fast-growing.
„ *teysmanni*.—A native of Java.
„ *toona* —Already growing well at Kearsney, Sir J. Liege Hulett's estate on the northern coastlands of Natal. It grew 30 feet in height and 1 foot in diameter in 17 years in the Durban Botanic Gardens.
„ *velloziana*.—The fine Cedar of Brazil.

In tropical and semi-tropical Nicaragua eight species of Cedar occur, named respectively :—

Cedro espino
„ *real*
„ *comun*
„ *caoba*
Cedro
Cedro macho
Cerito
Cedron

The common Cedar in Nicaragua is *Cedrela odorata*. It is worked and floated down the river with Mahogony Swietenia.

Allied to the *Cedrelas*, yielding good timber, but not scented Cedarwood, are the Melias, particularly :—

(LEGAT)

Cocoanut Palm and *Eucalyptus tereticornis* in Botanic Gardens, Delagoa Bay

(LEGAT)

Tamarindus indica, Delagoa Bay Botanic Gardens

Melia indica.—Neem. Semi-tropics of India, much planted.

„ *azedarach.*—The Cape Syringa. Grew 20 feet in height and 6 in. in diameter in 17 years in the Durban Botanic Gardens.

„ *composita.*—Australia and semi-tropics of India, up to 6,000 feet. Fast-growing.

EUCALYPTS.

There has been a good deal of disappointment with the growth of Eucalypts on the Natal coast. Doubtless much of this disappointment is due to the planting of unsuitable species, or even when a suitable species has been selected, to getting seed from unsuitable sources—the southern Australian colonies instead of Queensland. It is curious to note that serious attempts have actually been made to grow Jarrah and other West Australian Eucalypts in Natal. Mr. Medley-Wood, the eminent Director of the Durban Botanic Gardens, goes so far as to think that the South African White-ants are more fatal to Eucalypts than Australian White-ants. This may be so, but I doubt whether Eucalypts on the Natal coast form an exception to the general rule that White-ants can only really damage growing trees when these are sickly or unsuited to the climate.

A great variety of Eucalypts have been tried by Sir J. Liege Hulett and others on the northern coastlands of Natal, with not always the most favourable results. The Eucalypt that is considered the best, both as regards growth and yielding a good serviceable timber not liable to split, is one which was obtained by chance some years ago from Australia, and which Mr. Sim has identified as our old friend, *Eucalyptus paniculata.* I found this growing well at Ottawa, on the coast north of Durban, and in that locality the growth averaged about half that of *Eucalyptus tereticornis.*

Most of the climatically suitable Eucalypts probably remain to be tried—see the list of Queensland timbers below. One of the most valuable trees that could be planted is the Eucalypt-like *Syncarpia laurifolia,* commonly called "Turpentine tree" in Australia. Sir Liege Hulett has proved the success of this on the northern coastlands.

In the list of semi-tropical Queensland timbers given below will be found 23 Eucalypts. Of these the tree that should be first tried, especially where the rainfall is good, is *Eucalyptus microcorys,* or Tallow Wood, a free-growing large tree, with timber equal to Iron bark for most purposes.

Tamarindus indica.—Tamarind. This is properly a tropical tree, but that it will respond to cultivation in the semi-tropics is shewn by the presence of a healthy-looking medium-sized tree in the Delagoa Bay Botanic Gardens. It is cultivated in Northern India in semi-tropical climates.

Tamarind is a tree that might be worth planting in the semi-tropics for the sake of its shade and pulpy acid pods. It was one of the most vigorous of planted trees on the Mysore plateau. A panel *at Kew shows handsome yellow and dark-brown markings. Rea notes that the Tamarind grows almost everywhere in the tropics, including the West Indies, where it is a large tree. Common on open plains. (Imp. Inst. Jour. Sept., 1902.)*

Though called T. indica, and growing well all over India, it is not indigenous to India, and is believed to be a native of Central Africa (Gamble).

Mora excelsa —Is a gigantic tropical tree that seems worthy of trial in semi-tropical timber plantations. It forms pure forest in Trinidad and Guiana, with straight mast-like stems of surprising length. It is one of the few tropical trees valuable enough to be exported, and will be found briefly described in this work.

Hymenea courbaril.—Another gigantic tropical tree good enough to be exported; will also be found briefly described for the same reason.

A tree of this species in the Natal Botanic Gardens lived for only 38 years, a short life for so long-lived a tree It had then reached a height of 66 feet and a diameter of 14 inches.

In this region, towards the tropics, the following little-known trees may also be worthy of trial planting:—

Albizzia toona —Acacia Cedar. The most valuable timber tree of the *Albizzias* Wood similar to *Cedrela toona.* A large tree with pinnate leaves and a dense head of foliage: numerous small leaflets more or less downy. Timber of a light colour for several inches from the bark, the rest resembling Red Cedar; a valuable wood for many purposes according to Bailey.

Albizzia lebbek —The Indian Siris, a well-known and valued Indian tree, largely planted. Grows very rapidly at first. Cuttings strike readily.

Albizzia odoratissima, Albizzia procera.—Indian trees to be tried with the preceding. *A. procera* is on the Australian semi-tropical list given below. The latter grew 35 feet in height and 1 foot 2 inches in diameter in the Durban Botanic Gardens.

Albizzia fastigiata.—This is the well-known Flat-crown of the the Natal coast.

Santalum album is a native of the cooler, drier semi-tropical highlands of S. India, lat. 12 deg., elevation 2,000 to 3,000 feet, mean temperature 74 deg, rainfall 40 in. I have seen it growing naturally on Nandidroog in a mean temperature of 64 deg. Fah., or the same as that of East London in Cape Colony. It is the most valuable tree in the world, its wood in the rough selling by weight at much the same price as sugar. It is a Government tree strictly reserved in Mysore, and its sale furnishes an important item of State revenue. There is a tree 35 feet high in the Durban Botanic Gardens.

Hàzamalàn (*Ravensara aromatica ?*) is the remarkable scented Cedar of Madagascar. It is said to have been successfully planted in Mauritius.

Dalbergia sisoo.—The Sisu. This and Sàl are the two most valuable timber trees of Northern India, extending into the sub-tropics of the lower Himalayas. The timber is durable and seasons well, but is liable to run somewhat small and crooked, and is somewhat too heavy, about 48 lbs. the cubic foot, or 8 lbs. heavier than Teak, for which it is commonly used in Northern India. It is a rapid-growing tree, specially at first, and is one of the most valuable semi-tropical trees in the world. It is the timber tree that has been most largely planted in India after Teak. It requires lime in the soil, and must be planted small from pots or tins, as it has a large tap root. A tree planted in 1892 in the Durban Botanic Gardens has failed, probably on account of the dry situation.

Shorea robusta.—This is a larger tree than Sisu, but the timber is still heavier—55 lbs. per cubic foot—and seasons badly. It is not so fast-growing as Sisu, but its strength and durability render it first-rate for outdoor use as sleepers, or as beams for bridges. It is *the* outdoor timber of Northern semi-tropical India as Sisu is the indoor wood. Sàl seed keeps badly, and would want careful packing in damp earth when being sent from India to South Africa.

Thespesia populnea.—This is a small tree a good deal planted in India for shade, with a handsome flower from which it gets its name of Tulip tree. The timber is durable and not very heavy (50 lbs. per cubic foot), and of undoubted use when it can be obtained large enough. The genus *Thespesia* is closely allied to the genus *Hibiscus*.

Persea nanmuh.—The Chinese Nanmuh or Coffin tree. This is perhaps the pearl of semi-tropical timber trees. It has timber of nearly the value of Sandal, and it occurs as a large, straight, tall timber tree. It grows in the extra-tropics as well as in the semi-tropics, and will be found described in the body of this work.

Pterocarpus angolensis (Transvaal Kajàtanhout).—The botanical name has recently been determined at Kew. *P. angolensis* comes across from West Africa. Of all the native semi-tropical trees this is probably the one that is most worth planting for timber. Whether it is sufficiently fast-growing to be grown with profit is a matter to be proved in small test plantations. Transvaal Kajàtanhout is certainly a wood of great beauty and value. At Pilgrim's Rest I saw some furniture made of this timber, quite remarkable in its beauty and finish. Its general appearance was between Teak and Walnut, and, like its valuable Indian co-species—Padouk—it was evidently not too hard for a generally useful timber. It occurs in the Transvaal low country, but particularly in the forests skirting the Northern Transvaal Drakensberg. There it is seen as a short thick tree up to 5 feet diameter, but not much above 25 feet of bole. It was the favourite furniture wood of the old trek Boers, but is not much used now on account of the risk of fever and the expense of getting it up from the low country with transport at its present high prices.

Pterocarpus is a tropical genus of about 20 species, including some fine timber trees. Padouk is *P. dalbergioides* and *P. macrocarpus*, and probably also *P. indicus* (Gamble). Hônè, one of the finest timbers of Mysore, is *P. marsupium*, and *P. santalinus* is the Red-sanders, a small pole tree of Southern India growing in open forest, and yielding Kino and the dye-wood once largely exported to Europe. *P. erinaceus* is the African Rosewood or Teak from tropical West Africa. This tree also yields Kino. *P. sericeus* occurs along the Magaliesberg (Burtt-Davy).

I mention Transvaal Kajàtanhout at some length here as not being an extra-tropical tree. It will not be referred to again. It must not be confounded with the Cape Kajàtanhout, which is *Strychnos atherstonii*, an unimportant extra-tropical tree extending along the coast into the semi-tropics, where it is known as Chaka's wood (Fourcade).

Besides Kajàtanhout, other indigenous trees that may be worth planting are:—

Pteroxylon utile, Sneezewood.

Knopjes Doorn, growing in dry country and yielding good durable fencing poles.

Lodhout, growing with the preceding and yielding a first-rate fencing pole.

Dodonea viscosa, a shrubby, small tree, but growing in very dry country.

Eugenia cordata, Waterboom.

Sideroxylon inerme, White Milkwood.

Olea laurifolia, Black Ironwood.

Strychnos atherstonii, Cape Kajàtanhout.

Colpoon compressum, Sumach.

Celtis kraussiana, Camdaboo Stinkwood.

ORNAMENTAL SEMI-TROPICAL TREES AND SHRUBS.

Of the many beautiful trees growing in the semi-tropics the following (most of them already growing in Natal) may be mentioned here:—

Hibiscus tiliaceus, the Durban street tree with large leaves and flowers. Grown from stakes inserted in the ground.

Sabal palmeto, the great fan-palm of the Gulf States, U.S.A.

Spathodea speciosa, a tree with dense foliage and large, handsome trumpet-shaped flowers.

Michelia champaca, a beautiful tree with sweetly-scented flowers, sacred to the Hindoos. It extends to semi-tropical climates in India, and has a timber resembling camphor wood.

Trichelia dregeana, a handsome indigenous tree.

Magnolia fuscata, a small tree with flowers that are small for a Magnolia, but remarkably sweet-scented.

Erythrina caffra, the well-known ornamental tree, with flowers of a vivid red.

Beaunsontia grandiflora.—This is a creeper, but it beautifies so singularly every tree it embraces, that it may well be added to this list. It and the Bougainvilleas are the most striking feature of Durban gardens. It has dense dark green foliage and large trumpet-shaped white flowers. Medley-Woods calls it the Nepaulese Trumpet Flower.

Nuxia congesta—Vlier.—This is the most beautiful tree in the Knysna Forest. Fourcade mentions it as occurring on the Natal coast.

Bougainvillea.—In Durban and Delagoa Bay these brilliant semi-tropical climbers may be seen on every side, their gorgeous colours glowing with an unsurpassed brilliance. Four kinds are distinguished—two shades of rose, the terra-cotta, and the common hardy magenta kind, which can be grown with success far into the extra-tropics provided the ground be well-drained and the situation warm and sheltered.

Gardenia.—Various species.

Francisea sp.—This is considered by some to be the finest flowering shrub actually under cultivation in Natal. It grows to a small shrub about 6 feet high, with purple flowers turning mauve and finally white. Several species of *Francisea* are cultivated as stove plants in England.

Poinciana regia flamboyante.—This gorgeous tropical tree is one of the most striking objects in Natal with its loose crimson flowers.

Ficus religiosa.—A good semi-tropical shade tree, commonly planted for avenue purposes in India. To make a tree it is only necessary to insert a stake in the ground at the beginning of the rains. It is a sacred tree among the Hindoos.

Ficus glomerata.—Grown as a roadside tree, like the preceding, in the semi-tropics of India.

Ficus bengalensis.—Like the above, but with somewhat denser shade. The most common of the Indian fig trees planted for shade.

Tecoma stans.—A shrub in the extra-tropics cultivated for its handsome yellow trumpet-shaped flowers, but in the tropics a small tree furnishing good durable fencing poles.

Tecoma capense.—Makes a handsome flowering hedge. Seeds freely at Delagoa Bay.

Tecoma grandiflora.—One of the largest flowerers, extending into the milder extra-tropics.

Tecoma gracilis.—A creeper sticking to its supports like ivy.

Acalypha versicolor.—This handsome copper-coloured shrub, grown with difficulty in Cape gardens, is one of the most striking features in gardens in Delagoa Bay and Durban, growing with luxuriance and producing masses of copper and rose-coloured foliage of striking appearance.

Lagerstrœmia indica.—Cultivated as a shrub for its handsome flowers in the semi-tropics of India, and extending far into the extra-tropics. It is at once noticeable in Pretoria, and is seen here and there in Cape Colony.

Mangifera indica meets the eye at every point along the Natal coast. There are numerous specimens in the Durban Botanic Gardens, growing to large trees sixty feet high. It has run wild, and become a forest tree in the tropics.

Jacaranda mimosæfolia.—In the Durban Botanic Gardens is a tree forty feet high and one foot ten inches in diameter. This is a tree deserving special cultivation in this region. It is a good timber tree, yielding one of the best timbers in semi-tropical Brazil, and a most gorgeous sight when covered with its masses of blue flowers, resembling Wistaria. See below in text.

Ilex paraquensis —The Maté tree. The great South American tea tree may be mentioned here. It fails at Tokai, but is growing in the Durban Botanic Gardens.

Sabal palmetto.—The great Fan Palm of the South U S.A. On the American coast it flourishes as far north as the latitude of Cape Town. It yields a durable timber.

Seaforthia elegans —A fine Australian palm, growing well in the Durban Botanic Gardens.

Below is a list of the Queensland timber trees that may be worth planting in semi-tropical South Africa. Some of them, it will be noted, occur also in the southern temperate colonies of Australia ; others also in India and the tropics.

For further information on the semi-tropical trees of India there is the classic " Gamble's Indian Timbers," 1902 edition.

For a good brief description of the trees on the list below the reader is referred to "Queensland Woods," by F. M. Bailey, Colonial Botanist, Brisbane, 1888.

The semi-tropical trees on this list that are most worth planting in South Africa are printed in larger type.

SEMI-TROPICAL QUEENSLAND WOODS.

Botanical Name	Common Name.	Remarks.
ACACIA DECURRENS	Black Wattle	See description below in the body of the work.
,, EXCELSA	Ironwood Wattle	Timber dark, hard, and durable
,, FASCICULIFERA	Fasciculifera Wattle	An erect tree with drooping branches and long flat pods Timber red and hard.
Acacia glaucescens	Rosewood	A tall erect tree with a valuable wood. This is probably the most valuable Acacia after Blackwood.
,, HARPOPHYLLA	Brigallow	A tall tree with a hard scented wood
, IMPLEXA	White Wattle	Small tree with white midsummer flowers. Useful wood prettily marked.
,, PENDULA	Weeping Myall	A small tree with dark, fragrant wood.
,, PENNINERVIS	Blackwood of N S.W.	Though a small tree, both bark and timber are useful
Afzelia australis	Johnson River Teak	A lofty tree with a brown Teaklike wood. Compare this with the Rhodesian Teak, *Afzelia cunanzensis*.
Agathis robusta	Queensland Kauri	Furnishes good deal timber.
AILANTHUS IMBERBIFLORA		A large tree.
ALBIZZIA PROCERA		A large leaf-shedding tree. Wood hard and dark. Quick-growing.
,, TOONA	Acacia Cedar	A large valuable tree yielding a Cedar wood. See above
ALEURITES MOLUCCANA	Candle-nut	A tall tree yielding the candlenut oil of commerce

Botanical Name	Common Name.	Remarks.
ANGOPHORA LANCEOLATA	Lanceolata Angophora	A Eucalypt-like tree with a second-rate timber
Araucaria bidwilli	Bunya-bunya	Furnishes sweet nuts as large as acorns. See description in list below
,, **cunninghamii**	Cunningham's Araucaria	Furnishes useful deal timber
BACKHOUSIA CITRIODORA	Lemon-scented Backhousia	A small hardwood tree with leaves scented like verbena
CALLISTEMON LANCEOLATUS	Red Bottle Brush	See description in body of list
Callitris calcarata	Calcarata Callitris	Rather slow-growing but ornamental small trees, often yielding handsome, cedar-like timber, the Cypresses of the South. See details below.
,, **columellaris**	Lofty sand pine	
,, MACLEAYANA	Stringy bark	
,, **robusta**	White pine	
CARAPA MOLUCCENSIS		Prettily marked red cedar-like timber. A medium sized tree
Castanospermum australe	Moreton Bay Chestnut	A tall tree yielding a timber like Walnut.
CASUARINA CUNNINGHAMIANA	Cunningham's Beefwood	Ornamental and second rate timber trees. See below.
Casuarina equisetifolia	Equisetifolia ,,	
,, GLAUCA	Belar of N.S.W.	
,, SUBEROSA	Straight Beefwood	
,, TORULOSA	Torulosa ,,	
Cedrela toona	Red Cedar of Australia	The most valuable timber tree in Australia. See description in text below
Dysoxylon fraserianum	Pencil Cedar or Rosewood	A large handsome tree with a valuable red timber. This is one of the most desirable trees on this list.
Dysoxylon muelleri	Pencil Cedar of Queensland, Turnip-wood of N.S.W.	A useful, red, cedar-like wood.
ECHINOCARPUS AUSTRALIS	Marrochi or Maiden's Blush	Cabinet wood. Soft and durable.
,, WOOLLSII		Useful timber, smelling of celery when freshly cut.
ELÆOCARPUS BANCROFTII		A lofty, handsome tree with large flowers and an edible nut.
EREMOPHILA MITCHELLI	Sandalwood or Rosewood of N.S.W.	A fragrant cabinet wood.
ERYTHROPHLŒUM LABOUCHERII	A so-called Ironbark	The hardest wood in Australia,
EUCALYPTUS ACMENOIDES	Acmenoides Eucalypt	See description below in body of work.
,, BAILEYANA	Baileyana ,,	
,, BOTRYOIDES	Botryoides ,,	
,, **crebra**	Ironbark	
,, HEMIPHLOIA	Gum-topped Box	
,, **maculata**	Spotted Gum	
,, **maculata var. citriodora**	Scented Gum	
,, **microcorys**	Tallow-wood	
,, **paniculata**	Ironbark	
,, **pilularis**	Blackbutt	
,, **planchoniana**	Planchon's Gum	
,, POPULIFOLIA	Poplar Box	
,, RAVERETIANA	Raveret's Gum	
,, **resinifera**	Resinefera ,,	
,, ROSTRATA	Rostrata ,,	
,, **saligna**	Saligna ,,	
,, **siderophloia**	Ironbark	
,, **siderophloia var. rostrata**	,,	
,, STEIGERIANA	Lemon Scented Gum	
,, **tereticornis**	Grey Gum	

Botanical Name.	Common Name.	Remarks.
Eucalyptus tesselaris	Tesselaris Gum	See below in body of work
,, trachiphloia	Trachiphloia Gum	Do, do.
Exocarpus latifolia	Sandalwood	Tall tree with a dark fragrant, hard wood
Ficus cunninghamii	Cunningham's Fig	A shade tree
,, macrophylla	Giant Fig of Queensland	A very good shade tree
Flindersia australis	Crow's Ash	Partial leaf-shedder. Timber yellow, hard, of great strength and durability.
,, bourjotiana		A noble tree with dense deep foliage Wood strong, durable, easily worked
,, oxyleyana	Yellowwood of Queensland	Timber tough, yellow, resists White Ants Tall tree.
,, schottiana	Ash or Stave-wood	Tall tree with large leaves and hard yellow timber
Geijera muelleri		A beautiful, marked wood. Heartwood dark clouded
Gmelina leichardtii	White Beech	See description below
,, macrophylla		Timber like *G leichardtii*
Grevillea hilliana	Silky Oak	
,, pinnatifida		Handsome tree with prettily marked pinkish wood, not too hard
,, robusta	Silky Oak	A large, handsome, valuable tree in the semi-tropics of the first importance.
Harpullia pendula	Tulipwood	A fine tree with beautifully figured wood
Lysicarpus ternifolius	Russel's Mahogany	A valuable, durable wood that has been largely used for railway sleepers.
Maba fasciculosa		Wood suitable for carving
Macadamia ternifolia	Nut tree	See below
Melaleuca leucadendron	Paper bark tree	See description below in body of work.
linarifolia	,, ,, ,,	
Melia composita	White Cedar	This is probably quite the same as the Cape Syringa. Wood easily worked, of a light red colour. A large tree in the semi-tropics.
Olea paniculata	Iron and Marble wood of N S.W.	Prettily figured hard wood.
Orites excelsa	Silky Oak	See below.
Owenia acidula	Sour Plum	Wood reddish, hard, but easy to work.
,, venosa	Crow's apple	Wood reddish, hard durable. One of the best timber trees of Queensland
Pentaceras australis	White Cedar of N.S W.	Grows in the dense wet coast forest.
Podocarpus elata	Queensland Pine or She-pine	See below in text.
Rhus rhodanthema	Yellow Cedar or Yango-jango of N.S.W.	A tall tree yielding a beautiful soft, easily-worked cabinet wood.
Sideroxylon australis	Crab apple	Large purple fruit, timber useful for building purposes.
,, laurifolium		Tall tree with sweet bark.
Siphonodon australe	Ivory wood	A tall tree with white fine-grained wood.

Botanical Name	Common Name	Remarks
STENOCARPUS SALIGNUS	Silky Oak or Beef wood	Graceful, erect tree, with hard reddish timber
,, SINUATIS	Tulip	Tall, handsome tree, with wood like English Beech
Sterculia acerifolia	Flame tree	Partially leaf-shedding Often planted for its brilliant flowers
,, DISCOLOR	Sycamore or Hat tree of N S,W	Leaf shedding
,, **diversifolia**	Kurrajong of N S W	The great fodder tree—see below
Syncarpia laurifolia	Turpentine	Furnishes teredo - resistant piles of great value. now being imported
TARRIETIA ACTINOPHYLLA	Stave wood or Ironwood	A fine large tree
,, ARGYRODENDRON	Ironwood of N S.W	
,, TRIFOLIATA	Stave wood	A tall tree
Tristania conferta	Common Tristania	A handsome tree, but with timber of rather doubtful quality in Queensland There is a fine tree 60 ft high in the Durban Botanic Gardens
,, SUAVEOLENS	Swamp Tristania	All over the Queensland coastlands A useful durable, mahogany-like timber
ZANTHOXYLON BRACHYACANTHUM	Satin wood	A valuable cabinet wood
ZANTHOXYLON VENEFICUM		Said to be superior to Satin wood

TEAK, MAHOGANY AND RUBBER TREES IN THE SEMI-TROPICS.

A question that has been often asked me is whether Teak, Mahogany and Rubber trees can be grown in the semi-tropics of South Africa. Teak, Mahogany and Rubber are all tropical trees. It is very doubtful if they could be grown with profit outside the tropics.

Teak, *Tectona grandis.*—For a note on the possibilities of Teak cultivation in the warmest parts of South Africa see my "Report to the Rhodes Trustees on the formation of a Park in the Matopas, and a note on Forestry in Rhodesia" (Cape Town, 1903). The northern limit of Teak in Burmah is just outside the tropics 25° 30′ but there it is mostly of stunted growth (Oliver). For successful cultivation it requires an equable moist climate and a mean temperature not below that of Delagoa Bay. There are probably parts in the valley of the Zambesi where Teak would grow well, but the chances of its proving a profitable cultivation there are small. In the hot steamy climate of Nilambur, S. India and on rich alluvial soil, Teak planting has succeeded admirably. But the mean yearly yield of the Burmese plantations is estimated at only 47 c. ft., and the natural Teak forests do not distantly approach this yield. (D. Brandis). In India labour costs 2½d. per day, so that with the more costly South African labour and the poor returns from the Burmese Teak plantations the prospects of successful Teak planting in South Africa are not encouraging. In the healthy parts of South Africa Teak would either not grow at all or grow badly, as it does in the Botanic Gardens, Durban.

MAHOGANY. *Swietenia mahogoni.*

Mahogany is almost as purely a tropical tree as Teak. British Guiana still produces about 3,000,000 cubic feet yearly after a century or more of bad British Forestry, and large supplies still come from Mexico and Cuba after centuries of bad Spanish Forestry. At last, however, we seem within sight of the inevitable exhaustion. Mahogany is such a unique timber, not only for furniture, but for house building, that measures to meet the failing supplies should be remunerative.

Though Mahogany is a tropical tree, it occurs well developed in semi-tropical country, and extends into the warmer side of the extra-tropics. For this reason and the interest that Mahogany wood has for everyone, I have given some account of it amongst extra-tropical trees. It may be noted here that the best Mahogany comes from Honduras, and is found in British Guiana between 10 degrees North latitude and the Tropic of Cancer, flourishing on the higher crests of the hills and preferring the lighter soils. In the better watered regions of the semi-tropics, Honduras Mahogany may perhaps be cultivated with advantage. As mentioned, the average annual export of Honduras Mahogany is three million feet, and the value of the import to England is about £750,000 yearly. The successful cultivation of Mahogany in India is described in Gamble's Indian Timbers. The historical trees of the Calcutta Botanic Gardens were planted as far back as 1795. Mahogany in India has grown faster than Teak, and the Calcutta Botanic Gardens' trees, when blown down in a cyclone, were cut up and the sawn timber realised good prices. It is not easy to understand why the tree has not been cultivated on a larger scale by the Indian Forest Department. It is only, however, in quite the tropical parts of India with a heavy rainfall that the growth of Mahogany has been really good. At semi-tropical elevations it has failed, though possibly this failure may be due to the intense dry season rather than to deficient heat.

The Mahogany tree in the Durban Botanic Gardens does not show the best growth. At 16 years of age it was only 25 ft. high with a diameter of 8 inches, and I did not think its appearance encouraging. Most probably, however, the tree cultivated in both India and the Durban Botanic Gardens is the tropical tree from the West Indies. There is a semi-tropical tree growing at elevations of 3,000 feet and above in Guiana, and at probably higher elevations in Peru and in semi-tropical Florida. Mueller states that Mahogany grows well at Port Curtis (lat. 24 deg.) on the East Australian coast. Seed from these semi-tropical trees is worth trial in the semi-tropics of South Africa.

Swietenia macrophylla. This is a Mahogany (said to have come originally from Honduras) that is grown in India with more success than the true Mahogany *Swietenia mahogoni.* Its timber is somewhat lighter in colour than true Mahogany, and may not be so good. I am not aware how this tree grows outside the tropics. Gamble recommends it for cultivation in preference to the true Mahogany.

SEMI-TROPICAL RUBBER TREES.

It is extremely doubtful whether rubber can be produced at a profit outside the tropics, especially when it is considered how well *Hevea braziliensis* is succeeding in the tropics. It is this that is being cultivated so successfully and on so large a scale in Ceylon. *Ficus elastica* grows freely in semi-tropical climates, but it does not produce commercial rubber outside the close moist climate of tropical forests. The Indian plantations of this tree are not being extended.

Isonandra gutta.—This is the tree from which the largest supply of Gutta-percha is obtained. It is a purely tropical tree, and therefore of no practical use for planting within the temperate regions of South Africa. It is true that Mueller mentions its having been traced up to 3,500 feet elevation, a semi-tropical climate corresponding with parts of Rhodesia. But it is probable that in such a semi-tropical climate the yield of milk would be greatly diminished or worthless as happens with *Ficus elastica,* and other sap-yielding trees.

In this connection I may mention the Cedar rubber tree *Manihot glaziovii.* Its cultivation might perhaps be attempted in the wetter and warmer parts of this region. It seeds in the Botanic Gardens, Durban, but does not make a good tree. I saw some young trees shooting strong in Mr. Orpen's garden at Salisbury, Rhodesia, but they had been killed to the ground by frost. *Manihot glaziovii* has not under cultivation fulfilled anywhere what was at one time hoped from it.

Landolphia kirkii.—The Landolphias are perhaps the only semi-tropical rubber trees that might be profitably grown for rubber outside the tropics, but they are creepers and give trouble under cultivation. A paper by Mr. Sim, the Conservator of Forests for Natal, on the cultivation of the Landolphia in Zululand may be consulted. (*Agricultural Journal,* Natal), 1904. In the low, hot, thorny forests of Zululand *Landolphia* is abundant in places. It grows away from water on dry sandy ridges, sometimes on pure white sand. This seems an inviting prospect to the owners of sand drifts in the semi-tropics! It is stated that the vine is not destroyed by tapping, since the best yield of latex is obtained from small cuts in the bark, and these soon heal. Says Forester C. Hoff—"I have seen very large specimens of *Landolphia* which have been tapped every square inch from top to bottom, and these plants have a new vigorous grow of little side branches all over them." *Landolphia* has a good natural reproduction, thousands of young plants being noted near old vines. *Landolphia* bears fruit which is eatable, and liked both by whites and Kafirs. The ordinary diameter of the rubber vines is 2½ inches, but vines up to 5 inches diameter at 5 feet from the ground have been measured. On an average a Kaffir can only collect about 1lb. of rubber per day. The Zulu name for *Landolphia* is Ibunqu.

Further interesting details regarding the growth of this tree in the forests of Zululand will be found in the Natal Yearly Report for 1904. (T. R. Sim).

FRUIT CULTURE IN ARGENTINA.

Chas. P. Lounsbury, Government Entomologist

The cultivation of fruit has become an industry of very considerable importance in the south-western and a few eastern districts of the Cape Colony during the past twelve years. Large amounts of capital have been expended in the purchase of land at high prices, and in the establishment of orchards in the face of costly initial preparation of the soil and the necessity of constant cultivation during the summer months to conserve the soil moisture in addition to such other difficulties as the absence of local experience in regard to the kinds and varieties of fruit that would thrive best. High prices for the products will be necessary for many years to secure a profitable return on the capital invested, and these the growers have thus far confidently expected from a constantly enlarging South African demand, and from the sale at fancy prices of choice fruits in London, New York, and other great cities of the northern hemisphere during their winter and early spring months. Without the over-sea markets, the industry would have little room for extension, and would doubtless lose much of that atmosphere of importance and specialization with which it is now surrounded; and to secure and hold these markets it is necessary that there be no competition from other countries, or that any competition which arises be successfully defied. The only countries from which there is much fear of competition are those in the same latitudes on the western side of the Atlantic, Argentina and Uruguay. Very little is known at the Cape relative to the conditions affecting an export trade in fruit from these countries; and, therefore, the following notes should not be without interest, though they merely make known the little I saw and otherwise learned during a few days' sojourn when recently in South America to study the reputed natural enemies of the fruit fly. My ignorance of the language of the countries and the brief time at my disposal were heavy handicaps in gleaning information, and doubtless some of my impressions are distorted, and my conclusions therefore more or less faulty. My chief sources of information were Mr. Robert N. Clark, of Quilmes, and Mr. J. H. Hunter, of Tigre; I visited the estates of these gentlemen, and to both of them I am indebted for numerous kind attentions. I have also to express my obligations to the British Consul-General, Mr. A. Carnegie Ross, for information, and assistance in meeting Government officials. I have had the advantage of a report in Portuguese on fruit culture in Argentina (*A Fructicultura em Argentina*) by Dr. Alberto Löfgren, the Director of the Government Horticultural Garden at Sao Paulo, Brazil; of a report by Mr. Carlos Girola, late chief in the Argentina Department of Agriculture on a great fruit exhibition held last year in Buenos Ayres; and another document by Mr. Girola, reporting on the work accomplished by his department up to 1904 (*Tomo I, No. I, Anales del Ministerio de Agricultura*). Dr. Löfgren attended the exhibition and spent a full month studying the horticultural conditions of Argentina on behalf of his State Government. Three of the photographs reproduced to illustrate this article were taken by him. The units of coinage, weight and measurement, used in South America, are unlike our own, and for convenience I shall give only the values in our equivalents throughout this article.

CLIMATIC AND SOIL CONDITIONS.

Argentina extends from 22°S to 56°S, a distance of over two thousand miles, all of which is on river or sea frontage; and the country embraces all sorts of climatic conditions from tropical to frigid, and from extremely humid to arid. In this article, however, it is proposed to discuss the conditions prevailing in the vicinity of the city Buenos Ayres only, as it is almost exclusively in that part of the country that fruit is likely to be grown for export. The city is in almost the same latitude as Cape Town, about 34°. It enjoys the same average temperature as our capital city, about 63°, but the range is greater, and as low as 25° is sometimes registered in the winter. The mean monthly range is from 50° to 75·6°, while at Cape Town the relative figures are 54·8° and 69·7°. The rainfall seems about as constant as it is in our fruit districts. The average is almost fifty per cent. greater, however, and a much larger proportion falls during the summer. The table herewith shows the comparison, the Cape figures being kindly given to me by Mr. Chas. Stewart of the Meteorological Commission.

Argentine and Cape Rainfall.

	Buenos Ayres, mean 1861-1896	Cape Town (Royal Observatory), mean 1891-1900	Stellenbosch, mean 1891-1900.
January	2·95 inches	62 inches	44 inches
February	2 50 ,,	·65 ,	·53 ,,
March	4·22 ,,	1·05 ,	97 ,,
April	2 82 ,,	1 95 ,	2·17 ,
May	2·83 ,	3·29 ,	4 37 ,,
June	2 85 ,,	3·84 ,,	4 14 ,,
July	2 13 ,,	4 22 ,,	4·05 ,,
August	2·27 ,,	3 80 ,,	3 70 ,,
September	3 06 ,,	2·58 ,	2 34 ,,
October	3 66 ,,	1·88 ,,	2·25 ,,
November	2·82 ,,	·92 ,,	1·04 ,,
December	3 93 ,,	·78 ,,	·85 ,,
Total	36·05 inches	25 64 inches	26·85 inches

The average rainfall at Buenos Ayres for the four summer months, November to March, is actually above the average monthly rainfall for the entire year; and during these months the precipitation is more than four times as much as at Cape Town or Stellenbosch.

Of heavy winds, there is some complaint, and screens of poplars and occasionally blue gums are planted in many localities to shelter orchards.

The country inland from Buenos Ayres is a vast, almost level, grassy plain for scores and even hundreds of miles. There is hardly slope enough for rapid drainage; and after heavy rains, great shallow vleis abound. The soil is a deep dark loam underlaid, I was told, with clay. The growth of the vegetation and chemical analyses shew it to be very uniform in character and rich in plant food. One might think the country at first sight too flat and wet for fruit, but experience shews that it is not. The roads, owing to the nature of the soil and the absence of any attempt at grading and hardening them, are almost impassable for a few days after a heavy rain. As good soil is all about and the country outside the city thinly populated, suitable

EXPLANATION OF PLATE. VIEWS IN TIGRE FRUIT AREA.

1 Peach plantation showing heavy weed growth. 2. Border of fifty acre vineyard. (From photograph kindly supplied by Dr. Lofgren) Note river channel to left The vines are trellised high to prevent damage by floods. 3 A packing house by river side. Note the small dock for canoes. Two large boats may be dimly seen in background.

Views at Tigre, near Buenos Ayres

land for fruit is not expensive. Twenty pounds an acre was mentioned to me as a high figure for land over a mile or two from the railroad stations half an hour's train journey from the city. Much cheaper land, however, awaits the prospective fruit grower in a wonderful region a short distance to the north of the city in the delta of the Parana River. This region is known as the Tigre, from its market town, and it consists of numerous low, alluvial islands, separated by narrow channels of the great river. Some of the islands have been settled for a great many years, but many at a greater distance from the town and railroad are still in their virgin state. An extent of hundreds of square miles, I was informed, awaits development. Much of it is said to be eminently suited for fruit-growing, and what is too low and wet for this purpose is good for the growth of osier withes and poplar wood, for the making of baskets and boxes. The river channels are natural roadways down which the fruit and other produce is floated in canoes to the markets alongside the wharves at Tigre. The most accessible of the islands have become the greatest source of supply of deciduous fruits for Buenos Ayres; but even now, I was told, really good new land with river frontage may be bought for three pounds or four pounds an acre. The clearing of such land is easy, and pays for itself; whilst the further preparation of the ground for fruit trees is limited to the digging of the holes. Ploughing is considered unnecessary, and trenching is an absolutely unheard of operation. The river rises almost every week, more or less inundates the islands for a few hours, and then quickly falls to its normal level; drought is, therefore, unknown.

KINDS OF FRUIT.

Recent government statistics state that there are about 200,000 acres planted with fruit trees, and 120,000 acres planted with vines in Argentina. About one-third of the total acreage of fruit trees is in the province of Buenos Ayres, and about three-quarters of the acreage of vines is in the provinces of Mendoza and San Juan. Neither the number of vines nor of the different kinds of fruit trees, nor the total number of all appears in the census statistics; but Dr. Löfgren, from information obtained by him, states that the fruit trees are about in the following proportions: Peaches, 40 per cent.; citrous fruits, 20 per cent.; figs and apples, 10 per cent. each; pears, quinces and plums, 5 per cent. each; cherries and all other kinds of fruit, including nuts, 5 per cent.

The total production of common wines is estimated to be about 275,000 leaguers, and of "fine wines and liqueurs" about 7,000 leaguers. **About 5,000 tons of grapes are said to be sold for table use, and about 6,000 tons converted to raisins. There are about 5,000 acres of vines in the Province of Buenos Ayres, and a large part of the production here is consumed as fresh fruit. Ordinary *vinifera* wine grapes are grown in Mendoza and San Juan, but about Buenos Ayres most of the vines are of inferior American kinds, *vinifera* varieties not being so profitable on account of fungous** diseases. Mendoza and San Juan are provinces in a dry region at the foot of the Andes Mountains, eight hundred to a thousand miles west of Buenos Ayres by rail; the vineyards there are under irrigation.

Citrous fruits do not thrive very well about Buenos Ayres, and few commercial orchards are seen except in the Tigre islands. The supplies for the market come chiefly from the Tigre and the warmer northern parts of the country, and large quantities are imported from Paraguay and small quantities from Brazil and Europe. The average importation from all sources is 12,000,000 fruits. The oranges I saw in the market were all small and were disfigured by a surface blemish caused by some insect or fungus. Bananas are nearly all imported. The peach is the most common fruit tree in the country. It grows almost everywhere most luxuriantly, bears heavily and as yet no very serious insect or fungous pest for it has become widespread. Solid blocks of thousands of trees are not uncommon about Buenos Ayres. Most of the choice varieties of Europe and America have been introduced, and some of them widely propagated. Mr. Robert N. Clark of Quilmes, mentioned in the first paragraph, has an orchard of 15,000 trees. He says he has tested over 200 varieties and found 64 to be satisfactory. His earliest peach is the Downing which generally ripens by the 1st December, and his latest a local variety which lasts up to about the 1st May. The peach season is at its height in the first half of February; plenty of peaches of several varieties, however, were on sale when I left on April 14th, although most of these came out of cold storage.

Crawford's Early, Brandywine, Grosse Mignonne, Elberta, Picquet's Late, Globe, Waldo, St. John and Mountain Rose were mentioned to me as the best kinds; Mr. Clark's preference is with the first four named. Some fruits of enormous size are produced; I was told of specimens measuring five inches in diameter and weighing fourteen ounces. Owing to the rapidity of its growth the peach tree is grown in plantations to furnish firewood in some parts of the republic; such plantings are not regarded as orchards in the statistics.

Apples are not largely grown anywhere, so far as I could learn, in Argentina. More are grown at the Tigre than elsewhere in the Province of Buenos Ayres, but the quality is inferior. Good apples are said to grow in southern and western parts where the winters are more severe, and it is probable that more attention would be given to the fruit about the federal capital, and varieties found that produce high class fruit despite the warm climate as has been done at the Cape, were it not for the woolly aphis. This notorious pest is extremely bad, and, taken in connection with the codling moth, appears to effectually check the extension of apple culture.

The pear is in almost as much disfavour as the apple, owing to its destructive pests, and as in the case of the apple most of the trees are of inferior varieties. The climate and soil about Buenos Ayres, however, appear very favourable to the growth of the tree, and some splendid specimens of the best cosmopolitan varieties of the fruit are produced. I saw many mammoth trees heavily laden with fruit, growing without any apparent care whatever, in grass pastures. The quince grows to perfection at Tigre, as does also the medlar.

Plums do excellently about the city and are receiving greater attention from year to year now that the Japanese varieties are becoming known. The Kelsey, the Burbank and Satsuma seem the best known and all fruit well; the Burbank is commonly called the Abundance. Cherries grow freely, but bear shyly. Prunes and apricots appear to be totally neglected. Fig trees are not numerous about Buenos Ayres, but are very common and said to do well in the central portions of the country.

CULTIVATION, PRUNING, LABOUR, ETC.

Ordinarily, before planting peaches, the ground is ploughed to a depth of four to six inches, and then harrowed. The after cultivation consists in winter ploughing and in an occasional hoeing during the summer to keep the weeds down. Cultivation to conserve moisture does not appear to be practised In the Tigre the custom is to plant without ploughing, and for three or four years to hoe close about the trees often enough to keep a small space clear, and later to merely mow down and remove the grass. The river might wash away the soil were the whole surface cultivated. (See illustration.)

The trees are generally planted in square formation at a distance from one another of about thirteen feet; in the best orchards the interval is made sixteen feet; but in many old gardens it is less than ten. Other kinds of trees are also planted close together. The forking of the trunk is generally about four feet from the ground, and it appears to be the custom to bestow some care on the shaping of the tree, however much pruning may be neglected later on in its life. The more enlightened growers prune more or less systematically to regulate fruit production; but the great majority, after the tree is formed, prune only to remove broken and injured branches, to prevent or remedy intertwining, and to admit air to the centre of the tree. Few practice any thinning of the fruit; and props to support over-laden limbs are much used. In one very large orchard I was told that the sale of the peach prunings for fire wood and pea supports practically pays for the work of pruning and cultivation

Manuring is little practised. In general, none is necessary, owing to the natural fertility of the soil; but some of the Tigre islands are now yielding a much diminished return compared with former years, owing to exhaustion of the soil. The removal, for feeding, of the grass and weeds from amongst the trees hastens the deterioration. Bone manures and slaughter house refuse ought to be cheap in the country owing to the tremendous animal industry.

In general, the growers propagate trees for their own planting, but trees are produced for sale by a number of the leading fruit-growers. Mr. Clark estimates that about 150,000 fruit trees a year are sold in the province of Buenos Ayres. He himself sells from 15,000 to 20,000, principally peach. Many two-year old trees are planted, and not a few older and fruiting ones. The prices vary with the kind of tree, the variety, and with the reputation of the grower. I was told that even the growers who sell at the highest prices refuse to guarantee their stock true to name. Mr. Clark sells ordinary sorts of one-year-old peach trees at about 45s. per hundred, choice new sorts at about 90s., and two-year-old trees at an advance of about 50 per cent. One-year-old apple and pear trees he sells at about 60s. per hundred; and citrous trees for 3s. 6d. to 7s. each. The apples and pears are worked on quince stock, and the citrous trees on bitter orange. The cost of producing nursery stock is much less than in the Cape Colony owing to the more favourable climatic and soil conditions and the cheapness of land.

Labour in all the fruit districts is more expensive than at the Cape. Mr. Hunter told me that the ordinary cost of a "peon" for work in the orchards on the Tigre Islands is £3 to £3 10s. a month plus food, drink, and sleeping accommodation. It is customary to mess the men at table, and the expense of this is about 27s. 6d. a head per month. The liquor furnished is principally apple cider, and its cost per head is about 4s. per month. The workmen for operations requiring care and skill, as the budding and grafting of trees, are paid higher wages—often as much as £4 10s. a month.

Disposal of Fruit.

The markets of Buenos Ayres must be capable of absorbing an enormous quantity of fruit compared with our South African markets. The city is one of great wealth, and with its suburbs it has a population of over nine hundred thousand people, almost all of whom are white. South Africa claims only about this number of whites south of the Zambesi. There are about a dozen markets in Buenos Ayres, and, with two or three exceptions, these are controlled by the municipality. Well-kept fruit stalls are a feature in all of them. Both wholesale and retail fruit dealers appear to be nearly all Italians. As far as I could learn, no sales are made by auction, but wholesale dealers are open to receive consignments for sale on commission. The public makes its purchases both in the markets and from innumerable hawkers who go from door to door, some with horse-drawn carts and some with hand-carts, but most with enormous self-carried baskets. The market middlemen are said to get the lion's share of the profits, and to give the growers almost no monetary encouragement to improve the quality of their fruit.

The growers are privileged to rent market stalls by the day or longer period for the sale of their produce, I was told, but very few seem to avail themselves of this means to directly reach the public. Attempts to sell in small lots direct from the farms on order, and through the agency of station masters on the suburban railroads, have not had encouraging results. A few companies formed of

Views in a Fruit Market at Buenos Ayres.

growers have of late opened sale rooms in the city, but it is still too early to say that they will prove satisfactory. One such company, called "La Cooperativa Fruticola," has its stand in a sort of pavilion built against the outside wall of a market on the principal avenue in the centre of the city. Herein fruit is displayed in small boxes resting on a wide inclined plane facing the roadway and in full view of passers-by. The boxes are of stiff paper, have covers, and are of a size to hold a dozen apples in one layer. Neat placards, prominently displayed, announce the selling price per box in different sections; the price varied from 9d. to 1s. 9d. a box when I was there. The idea is to furnish a package convenient to carry. Orders for large quantities are taken. There are store rooms and an office within the market. It is hoped to keep the establishment in operation through the winter by sales of tropical fruits from northern provinces and fruits from over-sea. The capital of the company is about £22,500, and is divided into 10,000 shares. The sales are made at one rate of commission for shareholders, and at a much higher rate for outsiders.

The bulk of the fruit grown in the delta of the Parana is sold by barter to dealers at the waterside in Tigre As already stated, the fruit is brought from the farms in boats. Nearly all of it is packed in baskets. Whilst in a general way the prices are governed by supply and demand, it often happens that very different amounts are paid for the same variety and quality of fruit at different parts of the wharf at the same hour. The dealers are said to combine to some extent to buy cheaply; whilst the producers sell independent of one another, and even try to prevent their mates from knowing what prices they realize The mid-season prices this year for the Alexander and varieties of its class was 1s. 3d. to 1s. 9d. a basket; for the Elberta, Mountain Rose, Waldo, St. John, Crawford's Early, etc., 2s. 6d. to 5s.; and for late clingstones, about 3s. 3d. Common green apples of fair size, when I was there, were being sold at 2s. 6d.; Mr. Hunter said the price would nearly double within a few weeks. A basket is supposed to hold about fifty pounds. (See illustration.)

There are several canneries where clingstone peaches are preserved in very thin syrup. I did not think to enquire about jam factories. Cider is made from the worm-eaten and most inferior apples. Dr. Lofgren states that there are seventeen cold storage establishments in the city. Mr. Hunter took me to visit one of the largest, and we found apples, pears and peaches in quantities. The peaches were in the ordinary fruit baskets of the country. The pears and apples were in large boxes that certainly hold over a bushel; each pear was wrapped separately, but the apples were merely separated by sheets of paper between the layers. The temperature in the room where the peaches were stored is kept between 36° and 38°; where the apples and pears were, at 30° to 32°. The manager

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EXPLANATION OF PLATE. VIEWS IN A BUENOS AYRES FRUIT MARKET.

Peaches and pears in the common fruit baskets of the country.

said he had no difficulty in maintaining the temperature within half a degree when uniformity was thought desirable.

The Argentine fruit basket is strongly made of osier, and consists of a base and a cover. The base is a little longer than wide, has flattened sloping sides, and the dimensions across its top are about double those across its bottom. The cover is of the same material as the base and of nearly the same shape and height; it is wired down after the base is filled and heaped to overflowing. Complete, a basket measures about 24 inches by 20 by 20 outside, and when packed honestly holds about a bushel of fruit. The fruit is subjected to much pressure in adjusting the cover, and when opened the mass has the appearance of having been in a pudding mould. The grapes, as well as the peaches and the firmer fruits, are shipped thus to the domestic markets, and in general they arrive in fair condition. Osier withes for basket-making are produced in immense quantities in the Tigre fruit area, and it was suggested to me that it might pay the Cape to import from there.

The wood for the fruit boxes used for the domestic and Brazillian trade is sawn in the country, and much of it is of Argentine growth; and I was told that the requirements of the Tigre can all be supplied from the local saw mills with poplar wood grown in the islands, and probably soon will be to the exclusion of the American and Swedish box wood now used for the English export trade.

EXPORT FRUIT.

At the Government office for agricultural statistics, I was informed that detailed data in regard to the fruit exports of the country were not kept. The only statement of interest that I could get was the following table, which shows the gross exports of all fruits for 1903, 1904, and the first two months of the present year.

EXPORTATION OF FRUIT.

Destination.	1903.	1904.	Jan. and Feb., 1905.
United Kingdom	11 tons	53 tons	28 tons
Germany .	5 „	...	.
Italy	2 „	3 „	2 „
Brazil	189 „	244 „	89 „
Bolivia	..	10 „	...
Uruguay ..	16 „	18 „	27 „
Total ...	223 tons	328 tons	146 tons

Grapes are included, but the officer in charge told me that he thought the quantity very small until the present season. Peaches plums and apples are the largest items, in the order given. The Brazilian sales are almost wholly for Rio de Janeiro, Sao Paulo and Santos. The consignments reach these places in five days. As all are large and wealthy cities, and as it is very difficult to grow the fruits sent anywhere in their vicinity owing to insects or unfavourable climatic conditions, it is probable that the trade will steadily increase. Rio has about 650,000 people, Sao Paulo about 300,000, and Santos about 45,000.

The shipments to England, of peaches at least, are likely to increase rapidly. At present, I believe, the shipments are all made by the Royal Mail Steamship Company boats, which sail from Buenos Ayres on alternate Fridays, and are due at Southampton on the Saturday twenty-two days later. The distance is only about 600 miles longer than from Cape Town, but calls are made at nine or ten ports, and thus the journey made to take relatively longer. However, it is claimed that peaches, plums, and grapes arrive in perfect condition. Various sizes of boxes and kinds of packing material are used, but the tendency now seems to be to follow the lead of the Cape in these matters. I heard of one very successful shipment of peaches this season in paper trimmings. The steamers lie in the dock at Buenos Ayres and the railroad trucks are brought alongside.

The Pacific Steam Navigation Company has a fortnightly service to England alternate with the Royal Mail service, but the steamers come around from Chile and take the Buenos Ayres passengers aboard at Montevideo. There is a weekly Italian service to Genoa, a fortnightly French one to Bordeaux, and a fortnightly German one to Hamburg; but I did not hear of any proposition to utilize these lines for fruit transport. Fast cargo steamers carrying passengers sail for New York about twice a month, but not on set dates. The chief passenger route to New York is by way of Rio de Janeiro. There is a fortnightly sailing from that port by the Lamport and Holt Line on the arrival of the Royal Mail Steamer from Buenos Ayres, but I do not think any cargo is transferred; the through voyage takes twenty-three days. Rio is still without docks for ocean steamers; so any transfer of cargo would have to be made in the bay. I did not enquire the freight charge of fruit from Buenos Ayres to England but Mr. Horace Pickstone tells me it is £6 *a ton against £3 10s. from the Cape.*

The first shipment of fruit to England is said to have been made by Mr. Clark in 1898. Now Mr. Hunter, another Englishman, is the largest shipper, and his facilities are worth describing. He does not grow fruit extensively himself, his prime business being the canning of fruit, in which industry he is the pioneer at Tigre. His factory and pack house are on a tongue of land adjoining the railroad station, and across a canal from the fruit market wharf. A side track from the railroad comes by the door, and the floor of the packing room is level with the floor of the trucks. A private jetty extends out into the river, and here fruit may be off-loaded from steam launches or other large crafts on to hand trolleys, which run on rails to the pack house; small boats may come to a side door direct from the river. The utmost care is taken to get fruit intended for export in perfect condition, and the growers are paid liberally to fulfil the requirements imposed The picking must be done after the dew is off the trees, and delivery made without delay. He furnishes special boxes with sliding covers; into these the fruit is gently placed in paper on a bed of wood-wool as it is taken from the pickers' baskets, and they are carried by hand to the boats. On their arrival at the packhouse the fruit is carefully examined, and any not up to the required standard is returned to the producer. That selected is then wrapped in silk paper and packed with wood-wool in boxes similar in all respects to those used at the Cape. The filled boxes are then put in cold storage under the same roof. Three or four are wired together to facilitate handling them. Mr. Hunter says that he has found that he can keep peaches, selected and packed in the manner described, for thirty-five days in the cool room without their deteriorating in appearance or flavour. Towards sunset of the day before the steamer is to sail, the boxes are trucked from the store into an iced car, the distance to which is only about 50 feet and on the same level. The car is attached to a passenger train, taken to Buenos Ayres, and immediately switched to the ship's side. Here the shipment is again taken in charge by Mr. Hunter and his men, and in about three hours from the time the doors of the packhouse cold store were opened, the fruit is in the ship's chamber. The steamers carry chilled beef, cargo which must be kept at a practically uniform temperature, and hence special refrigerating engineers are on the staffs. Mr. Hunter, as the chief fruit shipper, is privileged to fix the temperature at which the fruit chamber is to be kept, and that temperature, I was told, is maintained throughout a voyage within half a degree Fahrenheit. Peaches are carried at 38°, I understand.

Shipments of grapes are being tried by Mr. Hunter. He cannot secure a suitable product locally, and got all his supply this season in one of the irrigated districts, San Juan I believe, at the foot of the Andes. The distance is about 900 miles by rail, and the railroad carriage amounted to about £4 12s. 6d. a ton. The first cost of the grapes approximated 1d. per lb. Three varieties were brought down, and I think all three exported. One was very similar to the Cape Hanepoot, another much like the Red Hanepoot, but more crisp, and the third a small blue grape. A shipment was made April 7th. The bunches, all selected of course, are wrapped in silk paper and then packed in wood-wool, as is done at the Cape. Sliding-top shallow boxes, the same as he has used for peaches, were sent to the vineyards to receive the grapes. There is no good source of supply for *vinifera* grapes nearer than the Andean provinces, and hence as regards this fruit Argentina shippers are handicapped by a long rail journey. From what I heard and have read, I think the Cape also has the advantage of a better selection of varieties

Very little care seems to be taken in selecting and packing the fruit sent to the Brazilian markets. I saw peaches and pears in quantity, and also a few Japanese plums, in the markets at Rio de

Janeiro and |Sao Paulo; and all had come packed in large roughly-made boxes divided by a partition into two compartments. The commonest size of box measured about 33 inches by 20 inches, by 8 inches outside. Each fruit was wrapped in soft paper similar to that used for newspapers. No wood-wool or substitute for it was used. Most of the fruits arrive in a dry condition, but very few were soft enough to eat at once. At the time of my last visit, in late March, the peaches were nearly all large yellow clingstones, good to look at, but tough, juiceless, and with little flavour. On March 1st when I passed through, three or more distinct varieties were on sale, but a large yellow, solid-fleshed cling was even then the most common. On both occasions these large peaches were selling at retail for about 4s. 9d. a dozen; and smaller peaches were 3s. and upwards. The pears were chiefly Williams, selling at 4s. to 5s. a dozen and a much smaller, yellow, nearly round, juicy, sweet, but thin-flavoured sort selling at 2s. 6d, to 3s. 6d. a dozen.

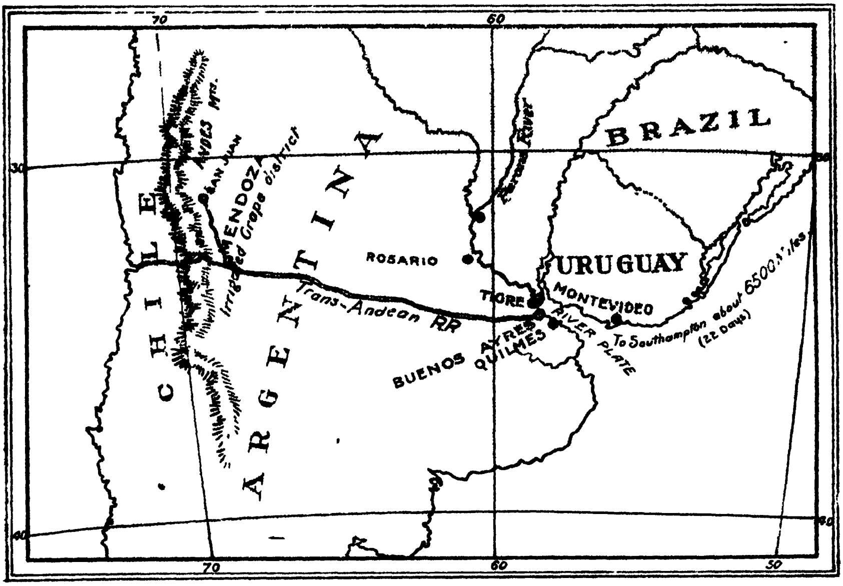
The country about Montevideo in Uruguay has the reputation of growing better flavoured pears and apples and even peaches, than are produced on the Buenos Ayres side of the river. The rainfall is slightly greater than at Buenos Ayres, but similarly distributed. The soil is deep and fertile, and land cheap. In time it is possible that an export fruit trade will be built up in competition with Argentina Docks are being constructed, but at present and for the next five years at least ocean steamers must anchor two or three miles out in the open sea to load and discharge, so there is now a great obstacle to shipping fruit in cold storage. The population of the port is about 225,000, and there appears to be a good local sale of fruit. There is as much ignorance as in Argentina, probably more, in regard to new varieties and modern methods of cultivation and pruning. The codling moth and the woolly aphis are most destructive, and no one seems to have any idea how to successfully combat these plagues.

FRUIT PESTS.

Argentina and Uruguay are as badly off as the Cape as regards vine and fruit pests. Phylloxera is said to be now spreading around Montevideo. It appeared in the province of Buenos Ayres a few years ago. At the Agricultural Department I was informed that efforts to exterminate it had been successful, and this after the pest had spread greatly, and destroyed whole plantations; but I think one is entitled to doubt the accuracy of the claim. Oidium is everywhere. Anthracnose and peronospora are more than most of the would-be vine growers can contend against in Buenos Ayres and some other districts. Half-a-dozen other fungus diseases of the grape are the subject of complaint, and more or less trouble is experienced from chlorosis, vrotpootje, sun-scald, frost, and a bacterial disease of the roots. A mealy bug (*Dactylopius*) is said to do much damage. Gall worms, and the *Margarodes*, a root-louse, are important pests, and much injury is ascribed to *Erinosis* and red spider. The citrous trees suffer almost as much from the purple scale (*Mytilaspis fulva*) as these trees do at the Cape from red scale. *Mal di goma* is said to be very bad. Every orange and naartje I saw in the markets had its rind mottled and spotted with small red or brown scabs and russet discoloration, due to causes unknown to me. The peach seems most free from pests, but leaf curl is often very injurious, and I noticed more or less peach freckle on the fruit in the markets. Plant lice and scale insects are said by Mr. Girola in his book "to annihilate entire plantations." Peach trees badly affected with crown gall were shown to me. Shot hole fungus is prevalent amongt the plums. Fusicladium affects the apples and pears, but is as at the Cape, a bad pest only in certain varieties of pears. The codling moth is exceedingly bad, especially amongst the pears. A grower in the Tigre islands, when I enquired, said that about half the apples fell from the trees, owing to this pest, and that about half the remainder were infested when plucked. The woolly aphis seems, however, to be considered the king of apple pests; it is given by Mr. Girola as the chief cause for the abandonment of apple growing on many estates. The pear slug is very injurious to the pear, cherry, and plum trees. The oyster shell bark louse (*Mytilaspis pomorum*), one of the many bad pests we haven't got at the Cape, thickly encrusts many apple, pear and other trees. The larva of a long-horned beetle (*Elaphidion collare*) bores down the twigs of peach, pear, apple and other trees, and, if not stopped, will tunnel through and through the larger branches, and may cause them to break with the wind or weight of fruit; the entered twig dies. Another beetle, an elaterid named *Heteroderes striatis*, is said by Mr. Girola to destroy whole plantations. A kind of bag worm (*Oiketicus platensis*, attacks almost all kinds of tree vegetation, and in many districts does considerable injury to fruit trees. Leaf-cutting ants (*Atta spp.*) do considerable damage in northern districts, but not much around Buenos Ayres and Montevideo. These insects are a frightful pest in Brazil; great expense is incurred in destroying them, and more in means to prevent their access to garden plants. It is a most common sight to see trees and bushes growing from within a channel of cement or tile kept filled with water. Migratory locusts do not reach Buenos Ayres, but the most northern provinces are over-run from time to time. A kind of fruit fly (*Anastrepha fratercula*) is prevalent in northern districts, attacking custard apples, guavas, and other fruits. Peaches in far northern districts are said to nearly all get infested by maggots, but of what fruit fly is not known. An undetermined species has begun to get troublesome near Buenos Ayres in late peaches, and this may possibly be the Cape kind, *Ceratitis capitata*, which is extremely destructive to peaches in the country back of Rio de Janeiro and Sao Paulo in Brazil.

The fruit growers of Argentina are far behind the Cape growers in the matter of combating pests; and where trees and vines are grown so close together as they are around Buenos Ayes, proper spraying is nigh impracticable. At present spraying is hardly heard of, and the few growers that spray seem to know only of syringes and knapsack pumps. Bordeaux mixture is the best known spray, and it is used to some extent to destroy pear slug. Paris green seems unknown to the growers; but it is recommended, without any details, for use against various insects, even scale insects (!) in Mr. Girola's highly interesting and valuable compilation on the work of the Department of Agriculture.

Plant import regulations have been in force for three years in Argentina. Importations are restricted to the port of Buenos Ayres, and are liable to confiscation and destruction if found infested with any pests, and to precautionary disinfection if a pest is suspected. It is intimated that the regulations are designed particularly against the Phylloxera and San Jose scale, and any importations from a country where either of these pests occurs is considered under suspicion. As a matter of fact no facilities for the disinfection of plants have yet been provided, and drastic actions are improbable unless either of the two pests mentioned is discovered.



SKETCH MAP OF REGION TRAVERSED.

FRUIT EXHIBITION.

The Government of Argentina really does very little to encourage the horticultural industry or to assist fruit growers in their difficulties; but last year it carried out a most praiseworthy undertaking, one which the Cape Government might emulate with advantage. I refer to an exhibition of fruit under the auspices of the Department of

Agriculture held at Buenos Ayres from November 15th, 1903, to April 30th, 1904. The decree announcing the proposed exhibition and soliciting applications for space was advertised in all the dailies and reviews, and communicated to the heads of the Provincial Governments, to the Agricultural Societies, Municipal Corporations, and Chiefs of Police throughout the Republic. The objects were stated to be: "to encourage the cultivation of arboreal fruits, to establish the nomenclature of the varieties on an authoritative basis, and to expedite the diffusion of superior varieties, both for the domestic markets and for export as fresh fruit." Three sections were provided for: 1st, an exhibit of fresh fruit of all kinds; 2nd, an exhibit of systems of packing fruit for domestic and foreign markets; and 3rd, an exhibit of horticultural implements, of systems of budding, grafting, and pruning, illustrated by photographs and models, of collections of fruit models and paintings, and monographs on varieties. First, second and third prizes, in the form respectively of silver medals, bronze medals, and honourable mentions, were planned for each class of exhibit; and also special prizes in the form of gold medals for the best collection of peaches, and for the best collection of fruits in general. The fruit exhibits were arranged under fourteen classes. The third section did not prove much of a success, perhaps owing to the short time there was for the preparation. No monographs or models were entered. The second section received better support. Nine growers exhibited specimens of one or more systems of packing fruit for export, and these exhibits attracted considerable attention, and, doubtless, taught many good lessons; none, however, that have not long been known to Cape exporters.

The first section amply made up for any deficiency in the other two, and made the exhibition as a whole be considered a grand success. Even to many of the best growers the exhibits were a revelation of what the country could produce, and what superior varieties were before unknown to them. Incidentally, a great deal of confusion in the nomenclature of varieties was disclosed, and in part rectified. Far reaching results in the improvement of fruits is confidently anticipated, and not the least effect will be on the choice of varieties hereafter produced for export. An official report of sixty-four pages, describing the chief features of the exhibit has been published, and from it most of the data in these paragraphs are compiled. Elaborate coloured illustrations of the most valuable varieties are being prepared, and are soon to be published with explanatory notes. A special report on the packing of fruit for export is also promised.

The one hundred and sixteen exhibitors of fresh fruit amongst them placed on view 3,805 exhibits and 848 repeats. One man is credited with 900 exhibits, one with 615, another with 454, two with 100 to 200, nine with 50 to 100, six with 25 to 50, nineteen with 10 to 25, and seventy-seven with 10 or less. Thirty-four made one exhibit only. The following table shows the number of exhibitors and exhibits of the different kinds of fruits, and the number of varieties distinguished by the judges:—

SYNOPSIS OF FRUIT EXHIBIT.

Class.	Varieties	Doubtful Varieties.	Number of Exhibitors.	Number of Exhibits
Peaches, freestone ...	116	52	86	1981
„ clingstone ...	22	9		
Nectarines, freestone ..	19	12		
„ clingstone ...	2	1		
Pears	42	25	23	173
Apricots	4		5	35
Plums	61		32	344
Apples	53		17	324
Quinces	4		14	64
Cherries	4		5	8
Grapes	100		23	248
Melons	27		11	124
Citrous Fruits ..	40		9	102
Figs	20		14	196
Persimmons	14		7	60
Custard Apples ...	2		7	70
Dried Fruits and Nuts ...			28	76

There were also a few exhibits of loquats, medlars, guavas, prickly pears, dates, and one or two native fruits. The cultivation of none of these fruits is of importance in the country.

CONCLUSION.

Enough has been said, I think, to show that in Argentina the Cape has a formidable competitor for the supply of northern markets with fresh fruits. The chief advantages which that country possesses are unlimited cheap lands, richer soil, a heavier and better distributed rainfall with consequent cheaper preparation and cultivation of soil, exceptional transport facilities from orchards of principal area to steamer, and far larger local markets. The chief disadvantages are a less frequent steamer service, a longer voyage and higher freight charges to England, much less average intelligence amongst growers, comparative ignorance of improved varieties and of methods to combat pests, lack of educational organisations, less influence with government, revolutionary tendencies of the people, and last, but not least, the lack of reliable, enterprising professional nurserymen, to supply good trees guaranteed true to name and on proper stocks, and competent to advise what varieties should be planted. The advantages are largely natural and must remain. The disadvantages, on the other hand, are such as must tend to diminish. A co-operative organisation, styled the Central Society of Fruit Growers, was recently formed to represent horticultural interests before the public, to promote co-operation, and to diffuse useful information; and such a body might do much in a few years to raise the status of the industry now that an interest in improved varieties and the possibilities of the over-sea markets has been aroused. And, moreover, it matters little to the success of a European export trade how much behind the times the mass of growers may remain, if a few intelligent shippers, say Englishmen like Mr. Hunter at the Tigre, can manage to secure at favourable rates the quality and quantity of fruit they require.

My impression is that the competition will soon be severely felt as regards peaches, and almost as quickly as regards plums, but that in pears the Cape is safe until the Argentine growers have learned to master the pests and have the right varieties in sufficient numbers, which may take many years. As regards apples, competition is likely to be still slower in becoming burdensome, not only because of the pests but because there are very few good varieties in the country and because the growers have the idea that their climate is unsuitable for the fruit. Mr. Hunter believes that his country can successfully compete in grapes, but for all time it is likely to remain handicapped by nearly a thousand miles of railage. Finally, South Africa will not have Argentina as a competitor should it ever export citrous fruits; Brazil is naturally fitted to enter this field, but its growers lack the necessary enterprise and the loading facilities at its ports are of the worst.

THE AGRICULTURAL UNION OF CAPE COLONY.

EIGHTH ANNUAL CONGRESS.

(Continued from page 65.)

THE INTER-COLONIAL UNION.

Mr. Fincham said he would like the report of the committee that were appointed to make enquiries into the Agricultural Union to take precedence. They had met the previous afternoon and had spent a good deal of time in discussing it.—Agreed to.

Mr. Lee read the report, after which Mr. Fincham said the suggestions were framed as a result of the discussion that took place. The Committee had received very great assistance from Dr. Gunning of the Transvaal. The rules were not actually opposed to, but were dissimilar to those passed in the Transvaal. The Union must not forget that things had changed considerably since the matter had been discussed in the Transvaal.

The Hon. Secretary said the question of representation had been discussed at great length in Pretoria. Supposing Rhodesia, Cape Colony, and the Orange River Colony did not send delegates and the Transvaal and Natal sent them to the Conference, would those two States have to go away without considering any business because of the dilatoriness of other States? He would suggest that if any two States were represented business should be allowed to go on.

Discussion ensued as to whether this Union had the power to alter the rules.

The Hon. Secretary submitted the following:—

"That this Union approves of the rules drawn up by the Committee as a basis for any rules to be drawn up by an Inter-Colonial Conference."

The Chairman said it went without saying that one Union or one portion of South Africa could not dictate to the other portions of South Africa, and before it could be adopted they should be consulted.

Mr. Hobson asked for some explanation. He took it that if the resolution were carried, there could be no further discussion.

Mr. Fincham said the draft rules were intended as a basis for the Inter-Colonial Union, and it was for the Congress to decide whether they were to form that basis or not. The Committee had taken the rules that had been framed in the Transvaal by the Union that had not yet been established, and changed those rules where necessary. They had now brought them back for the Congress to decide what was best to be done with them.

The Chairman pointed out to Mr. Fincham that they must all bear in mind that the rules the Committee had before them were the rules framed in Pretoria last year, and which were supposed to be the basis for the formation of the Inter-Colonial Union. There were delegates present at the meeting from Natal, Rhodesia, Orange River Colony, Transvaal, and the Cape Colony, and in that respect t was far more representative of South Africa than the present Congress was.

The Hon. A. Douglass seconded the adoption of the rules. He said they could not lay down rules binding on other parts of South Africa. He did not think the rules had been changed very much, but they had gone into them more carefully than the Committee which considered them at Pretoria had; and besides they had had a printed set of rules to pull to pieces. They discussed the question of the number of delegates to be sent by each State, and they decided that each of the five States should send five men, that was, twenty-five men would be the sole voice of agriculture in South Africa. Further, the States, whilst sending five delegates, could send as many more as they wished to debate the different subjects, but they could not have voting powers. He thought that in that departure they would have the support of the Congress. They also held that if any one of the five delegates were unable to attend a meeting, the other delegates should have power to appoint one of the debating delegates to his place. Then it was suggested again that as they admitted poultry clubs through the Union, was it advisable to give these debating powers to delegates from these small poultry clubs. But of course that matter could be settled at a later stage. That had been the main departure that had been made, and he thought it would commend itself to the Conference.

Mr. Fincham withdrew his motion and accepted the one proposed by Mr. Brown.

Mr. Hobson raised the question of representation in another form. He thought that the representation of Cape Colony was entirely inadequate. It was the oldest, most populous, and the most wealthy State in South Africa, therefore its representation on the Inter-Colonial Union should be greater than that of other States.

The Chairman: Had that matter not better be discussed when the Union is further advanced? It may keep other States from joining if they think they will be in the minority.

After discussion Mr. McIntosh, at the request of Mr. Brown, consented to move the resolution standing in Mr. Brown's name.

Mr. McIntosh's resolution, which read as follows, was ultimately carried:—"That this Union approves of the rules drawn up by the Committee as a basis for any rules to be drawn up by an inter-Colonial Conference, with instructions to its delegates to endeavour to obtain a more just and adequate representation for the Cape Colony."

THE BRANDING ACT.

The Congress next proceeded to discuss the necessity for a compulsory Branding Act.

The Chairman said this was a matter which required their serious consideration. He would like to point out that in Australia and New Zealand the greatest trust had been laid on branding. In

Carberry, in the Rocky Mountains, cattle were herded together to the number of 200,000 to 300,000; and everybody's cattle were just as safe there as they were in the kraal, because they were all branded. There was no stock thieving there; in fact, the man who took cattle with another man's brand on them was looked upon there much as a murderer would be looked upon in this country. Every year the cattle were rounded up and branded, and if an animal was found with another man's brand in the herd that were rounded up it was immediately sent over to him. Now, in this country they knew that in the neighbourhood of native locations a great amount of stock-thieving was carried on. He believed there was a law in this country against mutilating the ears of animals by cutting them short, but it was not necessary to inflict any pain in branding. The different brands of the different districts ought to be registered either with the Field Cornet or the Magistrate; so that if a man lost an animal and found it in the possession of somebody else, he could easily identify it by this brand, and that would save them going through a troublesome court of law. It could not be the property of the man in whose possession it was found, unless he could prove that he had bought it. Such a law would be very convenient to large stock farmers, who live near these locations.

Mr. Mayo said he thought a compulsory Branding Act would be very useful. Wholesale cattle thefts were being carried on by Kaffirs, who were very clever at closing up all traces. It was the impression in his part of the country that if every person branded his cattle there would be less of that sort of practice carried on.

Mr. Lee said there was no doubt but that the Union favoured the breeding of good stock, and it should do all in its power to protect it. The Branding Act was in force in Australia. The point had been raised with regard to the cattle purchased by speculators, and that the continual branding, consequent on their always changing hands, would diminish their value. He did not think it was necessary to brand them every time they changed hands, because if they had one brand on them they could generally be traced.

After a lengthy discussion, the Hon. Secretary moved the following resolution: "That this Congress affirms the principle of a Compulsory Branding Act, and refers it to the Executive to draw up a report and submit it to the next Congress." Mr. Evans seconded.—Carried unanimously.

CO-OPERATION.

On the recommendation of the Darling Agricultural Society, the question of co-operation amongst farmers was next-discussed.

Mr. Versfeld said the Darling Agricultural Society had sent this subject forward for various reasons. In the first place there had been a good deal of talk about co-operation. All public men and the press were advocating it, in fact so much so, that the Governor had said he was almost afraid to touch on it; but the feeling of the Darling Agricultural Society was that they wanted to do something beyond the talking stage. They wanted to do something practical, and for that reason they had sent the matter forward to the Union to be discussed. They wanted to have co-operation amongst the different Agricultural Societies, and thus bring co-operation to a practical stage. A good deal had been said by the different speakers in the past, with regard to the necessity for co-operation to bring the producer and the consumer in closer touch. He would give them a few facts from the Darling and Malmesbury districts. They would be astonished to hear that the highest price they could get for oats was 6s. for 150 lbs., oathay 2s. 6d. to 3s. 6d. per 150 lbs., and wheat 15s. 3d. for 203 lbs. He would like to know if any consumer of bread had had his loaf cheaper or larger when wheat was at 11s, than it was when it was at £1. (Cries of No, no). The fact of the matter was, the go-betweens or the middlemen were living on both sides; but they had in a way in the Darling district done away with the go-between, and they hoped in the near future to do away with the other and bring the producer and consumer together. They had co-operated in Darling in running a dairy, but now they wanted to go further. As His Excellency had said the previous day, when he had given them some very valuable advice, they wanted to erect co operative stores to sell machinery and agricultural implements to the farmers as was done in England. He was speaking not only for Darling, but for the whole Colony. He thought it would be a great step in the right direction. There was a feeling amongst the farmers in Darling that the Government should assist them, not so much financially as by sending somebody round to teach them how to co-operate properly. Of course, if they could get money at a low rate of interest from the Government, so much the better, because they could then erect stores. Then there was another point, and that was the selling of their produce. That would necessitate some financial assistance, as it would be necessary to erect stores near the railway. If they could get this money it would certainly assist them in co-operation.

The Chairman said this was a subject that he thought they would admit was of the greatest importance, and he thought that they had had such a very clear statement made to them by His Excellency the Governor that they ought to be more or less prepared to consider the matter from different points of view. His Excellency had shewn them that in a certain district in England which is worked in this way they had made a very large profit and the farmers of the district had become a wealthy community. They had heard talk of co-operation and they had heard of a dairy that had been started, but he did not think it had been undertaken properly. They had also heard that the consumer in the large towns was always clamouring for cheaper food. Of course the question of duty on food-stuffs was becoming very serious and at the same time Mr. Versfeld had pointed out that oats and wheat were at what could be considered a good price, and yet, notwithstanding this, they heard the cry of the consumer that Africa was so dear that he could not live in it. There was something radically wrong, and that was to be found in the fact that things, before they reached the consumer from the producer, had to go through several hands. With regard to fruit, they heard that it could not be got in Cape Town at even very high prices, and yet the producer was paid very poorly for it. Mr. Versfeld had spoken very strongly on the necessity for erecting stores. He took it that it meant that in each district there should be stores at the nearest railway station to store produce until it could be deported. Now, that meant a question of money, and, of course, the Government could not be expected to lend money to every little place that wanted it. What they wanted was agricultural banks. He thought that if they erected buildings in each district as stores, and had agricultural banks there and the co-operation in dairy farming, they would find that they were in the right road to success.

Mr. Krige said this was a very important subject and a very difficult problem to solve. Certainly the producer and consumer must be brought very much nearer than they were at present. Take the Fruit Market, for instance; during the last season the Stellenbosch farmers were unable to get a fair price for their fruit, and yet here in Cape Town the consumer had to pay a large price for it; in fact, sometimes it was difficult to get fruit at all.

The Chairman enquired what steps had been taken by the Horticultural Board on the recommendation for the erection of a big building for the immediate sale by *bona fide* producers to the consumer.

Mr. Malleson said that, as probably the Congress was aware, a committee had been considering this matter for some weeks, and one of the suggestions of the committee was that a central market building should be erected in each town, taking Cape Town as the first town to be experimented on. In this building there should be sales held by the producers, both retail and wholesale. It was suggested that the market building be on the Parade and in a suitable spot where ladies could go without being hustled by a crowd of Greeks and Malays. If there were not sufficient producers to occupy all the stalls, then the outside public could get them. It was pretty much a similar scheme to that in force in Covent Garden. If, however, a producer applied for a stall occupied by an outsider he could get it. Then, another suggestion was that an open space in Cape Town, such as Greenmarket Square, Woodstock and Sea Point be opened at certain hours of the morning to enable farmers to bring their waggon-loads of produce there and sell it. Then, with regard to co-operation in wine-making, in dairying, etc., it had been suggested that the Government should assist financially in making advances for the erection of buildings to any proper co-operative society. By that means the farmers would be able to store their wines for a number of years. It had been agreed that these co-operative societies should not store their wine for less than three years. With regard to the creameries, it had also been suggested that Government should advance money for the erection of them.

Mr. Evans said he would be very glad to see the matter of creameries introduced into the Bedford district. They had gone in for co-operative creameries on a small scale, and they had been very successful. They were now pasteurising milk and sending it down to Port Elizabeth.

The Chairman: What is the distance?

Mr. Evans: 120 miles.

The Chairman: And can you deliver fresh milk in Port Elizabeth in the summer time?

Mr. Evans: Yes, and we could do a great deal more if we had our private buildings. Continuing, he said he heartily agreed with what Mr. Malleson said on this matter. If they could only get the Government to give them asssistance it would be a fine thing. The dairying industry had improved wonderfully of late. There were farmers in the Bedford district who could never dispose of their milk heretofore, but now had a regular market for their cream. It worked most satisfactorily and every man, be he the owner of only six cows or a thousand, got the fair share of the money due to him. The Society had now become a company, and he was one of the directors. If they could get money at a low rate of interest to erect these buildings, he felt sure it would do a lot to further an interest in farming.

Mr. Lee said the discussion had been most interesting and most instructive. He wished to move the following resolution: "That the Executive Committee be instructed to consider the question of co-operation between agriculturists and stock farmers, with a view of bringing the consumer and producer into closer touch." He said he thought that if this question could be dealt with by any body of men capable of dealing with it, that it could be considered by the Union. He would go a little further and say that they would be shirking their duty if they did not tackle it. He was not opposed to any middlemen; he was prepared to live and let live; but he did object to the middlemen making their enormous profits. They found that owing to the extortionate prices charged by these middlemen, the consumer had to purchase the imported article. This question of co-operation was worthy of the consideration of the farmers and the general public. He would like to give the Congress some of his experiences. For four years past he had been supplying Port Elizabeth with fresh meat, poultry, eggs, milk, butter, etc., and he found that the greatest inconvenience he had to experience was the want of proper conveyances to carry the goods to the market. He did not wish to blame the Railway, but he thought better means could be provided. That matter could be settled by the Government later on. He could go into further details, but they were matters for the Executive to deal with when they considered this subject. He could then tell them what it cost him to put his produce on the market at Port Elizabeth. In support of his resolution, he wished to say that the Executive could obtain evidence of practical experience and results from well known gentlemen. He would not go into the matter further; but he would say in conclusion that if the subject of co-operation concerned anybody, then it concerned that Union.

Dr. Nobbs said he was particularly pleased to see the turn the debate had taken. He wished to tell the Congress a couple of things he felt sure would interest them. He knew of proposals that were on foot to commence practical co-operative societies in the Colony. There was at present a co-operative society at Stellenbosch, and similar societies were to be started at Tulbagh, Muldersvlei, Klipheuvel, Zandveld, etc. Mr. Versfeld, in his remarks, had spoken of the machinery necessary for co-operation, and had referred to co-operative societies as the immediate solution of several difficult problems. Mr. Lee had proposed that the Executive of the Union take the matter up. He would like to suggest a thing for their consideration, and that was where the Agricultural Union and Agricultural Societies should make it part of their duty to embrace co-operation as part of their recognised work. He thought it would be a good thing to encourage the Society to show parties who were anxious to start these co-operative societies the way to do it. They should have a society for the promotion of agricultural study, as they had a society for the promotion of Christian knowledge. He was also very glad to hear Mr. Versfeld say that he did not think State aid need only be pecuniary. The Government could grant money on productive works, and, therefore, they could give these societies some assistance. He was glad Mr. Versfeld thought that the Government could do more than that. There was one other point he wished to mention: it was not original. Mr. Versfeld had suggested that the Government should send people to the different societies to teach them how to start co-operation. Supposing they had a co-operative expert, he would understand co-operation to his finger tips, but might not know Cape Colony to his finger tips. There was an alternate proposal, and that was that Government partly assist to send a party of farmers who took a lively interest in co-operation to Europe; and they could see how co-operation worked there, and they could apply the knowledge they had learnt there in this country, because they would also have a knowledge of the land they had to work on. That was far better than one single man coming out here to teach the people the system of co-operation in force at Home. When these farmers returned to South Africa, they would be travelling apostles of co-operation. He had just mentioned that matter in the hope that it would receive further consideration. He heartily supported all that Mr. Lee had said.

Mr. Lee said he took it that the Committee were going to ascertain what had been done up to the present with regard to co-operation. They did not want them to interfere with any work that was at present in progress. It would be part of the duty of the Executive to collect all the evidence before they took any active steps.

Mr. Lee's motion was then put and carried unanimously.

VISITORS TO SHOWS.

The Congress proceeded to consider the following motion from the Port Elizabeth Agricultural Society to see if the Government cannot arrange with other Governments railway facilities for visitors attending Agricultural Shows. The Hon. Secretary said that as the Congress knew, the rates on the Cape Government Railways were very different to those in force on other lines. He would move that the matter be referred to the Executive to enquire into.—Agreed to.

CARETAKERS' PASSES.

The advisability of the Government allowing a free railway pass to each caretaker of a truck of stock, irrespective of the value of such stock to be exhibited at an Agricultural Show, forwarded from the Robertson and Montagu Agricultural Society, was next considered by the Congress.

Mr. De Wet said at present, if stock were conveyed to a show, the caretaker got a free ticket where it could be proved that the stock were of a certain value. That came very hard on the poor farmer who had only a small quantity of stock to exhibit.

Mr. Rawbone and the Hon. Secretary were deputed to make enquiries into the matter.

THE INTERNATIONAL AGRICULTURAL CONFERENCE.

The Cape Stud Breeders recommended that, in the event of the proposed International Agricultural Conference being held, South Africa should be represented, and that the subject be remitted to the Inter-Colonial Agricultural Union for consideration.

Mr. Lee formally moved a resolution based on the recommendation, which was carried.

THE STUD-BOOK.

Mr. Evans moved that the recognised trade mark of the South African Stud-Book Association be protected from unauthorised use, as well as the Common Seal of the Central Council.—Agreed to.

The Congress adjourned until Friday morning.

FOURTH DAY—FRIDAY, MAY 5TH.

The Congress resumed its deliberations at 9.30 a.m. on Friday morning.

MAYORAL INVITATION.

The Chairman said that he received an invitation from the Mayor of Cape Town (Mr. H. Liberman), asking the delegates to the Congress to be his guests at Camps Bay that afternoon. Whoever wished to go could inform the Hon. Secretary.

The Agricultural Bill.

The Chairman said that the first item the Congress had to consider was the Agricultural Bill. Mr. Sieberhagen was introducing it.

Mr. Sieberhagen, M.L.A., said that, in introducing the Bill for the consideration of the Congress, it was not his intention to speak on it. He just wished to get an expression of opinion from the Agricultural Union on it. If the Agricultural Bill became law, such institutions as the Agricultural Union would be practically wiped out.

The Hon. A. Douglass said that, if the meeting would give him their attention, he would endeavour to put the conditions of the Bill before them. Now, in the first place, this was a Bill which he would call "the Bill with a very big name," because the Bill was to provide for the better advancement of the agricultural industry of the Cape by the establishment of district agricultural associations and district agricultural committees, to incorporate district agricultural committees, agricultural and horticultural societies, and to establish a Board of Agriculture, a Board of Agricultural Education, and a Colonial Industries Board. The Bill started first by establishing agricultural associations; the qualification of membership of the association should be ownership of agricultural or pastoral land to the value of £500, or the occupation as a *bona fide* lessee of such land to the value of £500 sterling. The Magistrate of each district was to make out the list of such persons as soon as this Bill became law, which he would do for the Divisional Council's voters' lists, and every man with that qualification would be a member of the association; but, as it was confined to owners of pastoral and agricultural land, it would exclude the owners of properties in villages from the membership. As soon as these lists were made out a meeting was to be held of members in each field-cornetcy, and they were to elect one member to the district committee, and then their duties ceased. They then got the district committee, which would consist of this one man from each ward in the district, with the Magistrate as Chairman. This district committee, which met once a year, would elect one of their number to a circle committee. His time of office would be three years, then their duties practically ended. Now, although they had the district committee elected every year, it was only once in every three years that the district committee would elect one member for the circle committee. The district committee had to meet once every year, and every farmer in the district of over £500 valuation could go to that meeting and discuss any farming matters. This district committee was compelled to have a secretary and treasurer, or the two offices could be combined, and an auditor. The district committee sent their delegate to the circle; the circle came together once in three years in some central place, and there elected one of their members to the Board of Agriculture, and then their duties ended for a period of three years. The circles were to be composed of the districts as for the Legislative Council, and the Electoral

Divisions of Tembuland and East Griqualand combined. They then came to the Board of Agriculture. To his mind, this Board of Agriculture was going to be a disastrous thing for this country. It was to consist of ten members elected by the circle, four by the Minister, of whom one should be one of the permanent heads of the Department of Agriculture, and who would be chairman. Now, to his mind, the Agricultural Board would simply be a Board for the Minister of Agriculture to get behind, and if he wants to do anything he gets them to direct him to do it. The Minister of Agriculture was at the present time liable to be removed by Parliament if he did not satisfy them, but Parliament had no power to remove the Board. His opinion was that, as things at present stood, they had in the Minister of Agriculture somebody that the country could go for, but they could not go for the Board. The Board had no soul, but the individual had. It was an extraordinary thing that this Board had very large powers in some things, but its powers did not extend to things it should deal with. The working of the Scab Act had not been what it should be, but this Board did not deal with that. Another thing which the Board should deal with would be the outbreak of disease in animals or plants, but that was also excluded from the Board. Those were two very important points where the Board would be of use to the Minister. The duties of the Board were set forth as follows: The best means to enable and assist farmers to co-operate for their mutual advantage, and the apportionment of any sums of money voted by Parliament for the advancement of such co-operation. The apportionment of money set apart by Parliament for Agricultural Shows and Exhibitions. The apportionment of sums of money set apart by Parliament for the destruction of vermin. The establishment of credit banks for the purpose of assisting farmers with loans at low rates of interest. The establishment of experiment stations, and the conduct of experiments in diseases of stock, analysis of soils, growth of crops, and other matters. The means for the improvement of markets for the sale of Colonial produce. On the subject of the credit banks, he said it was a sort of bunch of carrots in front of the donkey's nose. To his mind, the establishment of banks on the plan in which they had been established in Europe would not be a success in this country. The Government would guarantee the credit bank in its loans, and the security they would have to get would be a brother farmer. He thought it would be disastrous to the farming community. He thought that, if the Government wanted advice on farming matters, they should look to associations like theirs; and he thought that, if the Government really wanted advice, they would have sent the Minister for Agriculture to the meetings of the Congress, and let him listen to what the farmers had to say. They would also find him attending such meetings as the Farmers' Congress, Bond meetings, and other similar associations; in that way he would be able to find out what the farmers really wanted. They had the Acting Minister for Agriculture present one day on an official visit, but they had not seen the Under Secretary for Agriculture present at any of their meetings, trying to learn the wants of the farmers. He concluded by moving the following resolution :—"That this Agricultural Union disapproves of the Agricultural Bill in its present form, and that the President be requested to sign a petition to Parliament on behalf of this Union, praying that it may not be made law."

The Hon. Secretary said that a point had just struck him, which was of some importance. Mr. Douglass in his motion condemned the whole Bill, but the industrial people of the Colony were prepared to accept the portion that referred to them, and he would like Mr. Douglass to add to his resolution the fact that the Union expressed no opinion with regard to the Industrial Section. He would move as an amendment to Mr. Douglass's motion the following :—"That, in the opinion of this Union, the Agricultural Bill should not be proceeded with during the present session of Parliament, so as to give the country an opportunity of discussing same. The Union expresses no opinion with regard to the Industrial Section of the Bill."

Mr. Ryan seconded Mr. Brown's amendment.

Discussion followed at some length, when Mr Douglass consented to add to his resolution the fact that the Union expressed no opinion as regards the Industrial Section of the Bill. The Chairman then put Mr. Douglass's motion, which was carried by a large majority.

UNIFORM SCAB LAW.

The Chairman said that the question of a Uniform Scab Law had been brought forward by Pretoria, and Dr. Gunning was to have spoken on it, but he had been called away.

Mr. Fincham said he would move :—"That this Agricultural Union confirms the desirability of an Inter-Colonial Scab Law."

Mr. Ryan said it might be presumption on the part of one like himself to speak on a subject like that, but he merely rose to speak as it were against this motion. In his opinion, he thought there would be considerable opposition to this motion, as the condition of things in the coast districts was very different to those in the North-western districts. He would like to hear somebody who was better acquainted with the matter than he was. He feared that a uniform law would be a great hardship on many farmers.

Mr. Hockley (East London) said that, if the delegates of the different Colonies met, some compromise might be arrived at. He would suggest that the following words be added to the resolution : "And that none of the stringent regulations in force in this Colony be relaxed."

Mr. Fincham said he did not quite catch what Mr. Ryan meant in his objection to the Act.

The Chairman said he would like to say a few words on the subject. The last time he was in the Transvaal great hardships were suffered by a certain section of the population in the higher districts of the Transvaal, which is a very good sheep country. The people, as long as he could remember, had migrated every year with their sheep into Swaziland and Natal, where they owned farms. Lately, inspectors were put on the border to inspect the sheep. The people were detained there for a long time on many occasions, and they had to pay whilst there. They had to pay 6d. a head for a sheep, and afterwards 3d. a head for inspection, and when it was recognised what a great hardship it was he went to the Government and drew their attention to the matter, and told them that it would create great discontent. The result was that the matter had since been mitigated. They knew perfectly well that during the drought their farmers had to go into the Orange River Colony. He was not prepared to say what regulations existed on the border now, but he took it that in all cases of that kind a uniform Scab Act would facilitate the removal of sheep, and he did not think there would be any hardship in dealing with the sheep. There were parts of the country like the Northern Districts where it was found very difficult to dip sheep at certain times of the year. If they wanted to make South Africa a sheep-growing country, they would have to have a uniform Scab Act.

Mr. Evans seconded Mr. Fincham's resolution, which was carried unanimously.

THE AGRICULTURAL BILL AGAIN.

The Hon. Secretary said that the petition with regard to the Agricultural Bill had been drawn up and signed by the Chairman. He wished to know who was to present the petition to Parliament.

It was decided that Mr. Sieberhagen should have charge of the petition.

MILITARY REQUIREMENTS.

The Congress proceeded to consider a motion from Pretoria with regard to supplying military requirements locally.

The Chairman said he would like to say a few words on this subject. When he was in Pretoria, there was a considerable amount of trouble about the supply of military requirements. He read of a case the other day in which a Dr. Lane, who had since gone to Europe, laid down that the disease which had broken out in the military cantonments at Middelburg, and which caused the rotting of bone, was due to the use of colonial forage, a large portion of which was supplied from the Western Province. He (the Chairman) wrote about it to the authorities, and a general outcry was raised about the matter, with the result that the objection had now been withdrawn and the fact established that the disease was not due to the forage, but that the disease was brought from oversea. He took it that the resolution was placed on the paper to induce the military authorities to purchase colonial produce in preference to oversea produce. In the Transvaal the Government went so far as to get the farmers to form Associations to guarantee the supply of certain quantities of forage and other requisites for the military authorities at certain rates, and the farmers bound each other to do that. So that they really got a fixed price for their produce, and the military authorities would not be left in the lurch. That was the idea, and he took it Dr. Gunning, in bringing the subject forward, intended to speak on it on these lines. He had 40 years' experience of horse-breeding in this country, but had never seen this disease. They had heard the previous day from Mr. Versfeld that he was only getting 6s. for 150 lbs. of oats. Well, if that was the case, there must be something wrong, for the Government at the present time were importing large quantities of alfalfa from Montevideo, and it must cost more than that to land it. If the farmers of the Colony could guarantee them a certain quantity of forage yearly that would be obviated.

Mr. Theron said the case referred to by the Chairman had been brought before Parliament by Dr. Viljoen, and he thought that perhaps the gentleman who had made the statement that the disease was attributable to colonial forage would be called upon to give evidence on that point. A committee had been appointed to enquire into the matter. He believed that the prejudice against colonial forage was gradually dying out, and that to a certain extent the military were prepared to buy their forage. The report of the Committee was not yet on the table of the House, but he believed that when it did come it would be a good report, and would clear the air greatly.

The matter was left in abeyance.

PROTECTION OF WINES

Mr. Krige (Stellenbosch) brought forward a notice asking Government to grant better facilities for the sale and protection of light, unfortified colonial wines, special attention to be paid to the adulteration of liquor. He said that many of them might think that this motion was not of much importance, but it affected a large number of people. If they took the greater part of the Cape Division, they would find that it was nearly all a viticultural district; it reached from Cape Town to Worcester, Montagu, Robertson, and as far as Oudtshoorn. It affected a large portion of the community of these places. He would like to inform the Union that the wine industry at the present time was in a deplorable state. Wine was only fetching from £2 10s. to £3 per leaguer now. He might be asked where the fault lay; but, in the first place, the drought was responsible; secondly, the financial state of the country; and thirdly, the imposition of the Excise Tax. The latter had not affected it very much yet, because Government had come forward with the aid of Parliament, and given them a certain amount of money on each leaguer of brandy. If this had not been the case, he could safely say—and he felt sure that others would bear him out—that wine and brandy would be totally unsaleable. The present state of affairs could not go on; they would have to find a market for their produce. Now, the question arose, where are we going to get that market? He continued at some length in this strain, and concluded by proposing the following resolution:—"Considering the very unsatisfactory state of the wine industry at present, this Union is of opinion that the restrictions under the existing Liquor Act, prohibiting natives from obtaining light and fortified wines, should be deleted from the Act."

Mr. De Wet seconded the resolution. He said that there was no use in encouraging viticulture if these restrictions were not removed. Mr. Krige had spoken of the demoralisation of the natives. He could assure the gathering that the adulterated stuffs they got did more in that way than any wine they might drink. He employed a number of natives, and they got more than a bottle of wine each every day, and they worked well for it. He always gave a boy who drank the preference in a job; the boy who was fond of his glass was always a more satisfactory workman.

Mr. Evans opposed the motion. He said they had had to fight hard for a Liquor Law, and now it was in force it was advisable to leave it there. The native was better off without liquor than with it.

Mr. Van Breda said he regretted that this very important question should have come up so late in the proceedings. He would have liked to have taken an active part in the discussion, but it was a question that was not desirable at the present time. He was very glad to see the action Mr. Evans had taken in the matter. He had had considerable experience of giving liquor to natives, but since he had been on his present farm he had never given a drop to any of them, and there was a great difference in the state of his farm now than when he gave his natives liquor.

Mr. Malleson said he never gave his boys liquor, but if they wished to go to the canteens on Saturday nights he allowed them to do so. What they wanted in force was a licence that would only carry the sale of light wines.

Mr. Evans said that the brandy that the boys got was colonial. If they allowed light wines to be sold, they would find that the boys would get stronger drink.

Mr. Hamman said he would like to reply to Mr. Van Breda. Mr. Van Breda was a sheep farmer, whilst he was a wine farmer. He paid £3,000 a year to the Government; Mr. Van Breda paid nothing. It would be a different thing if he had to pay duty on his clippings. £400,000 was sent away last year for foreign wines, and he questioned why they should be allowed into the Colony when the colonial demand could be easily supplied at home.

Mr. Van Breda said that Mr. Hamman seemed to misunderstand him. He did not intend his remarks to injure the liquor trade; he simply rose to defend the interests of agriculturists who had suffered through liquor being dealt out to their men by unscrupulous licence-holders. That had been the case at Bredasdorp.

Mr. Lee said he supported Mr. Van Breda in his motion. He was opposed to supplying natives with liquor. It was unnecessary to go into details. He would ask the wine farmers who were delegates to the Union not to think that it was a wish on his part to oppose them, and therefore he hoped that they would not think it was a determined action against their interests. He thought the delegates should be given time to think the matter over, and he thought that to force a vote would not result in favour of the motion. He thought it would be advisable for each delegate to consult his society, and come back next year prepared to deal with the question.

Mr. Krige (Stellenbosch) said his object in bringing this matter forward was not to force drunkenness on the natives. He wanted this to be a wine country and not a spirit-drinking country. If he could reach the object he had in view, he was positive that the Kaffirs would never be demoralised by drinking a light class of wine; and, besides, it would keep them from breaking the law.

Mr. Ryan said that the Government had requested the Horticultural Society and the Western Province Agricultural Society to depute three members each to go into the question as to the best way to improve the wine industry, and their report stated that it would be best accomplished by means of co-operation.

Mr. Krige said the vital question was were they going to sacrifice the whole of the Western Province by ruining the wine industry? If he could get a promise from the Agricultural Societies to consider the question during the recess, he would withdraw his motion.

Mr. Van Breda's motion, which was as follows, was carried:—"That the question now under discussion lie on the table until next Congress, and that in the meantime it should be submitted to the various affiliated societies for discussion."

DRIFT SANDS.

The Congress next considered the following notice from Bredasdorp:—"That the Government be asked to take means to stop the present drift of sands in the Colony."

Mr. Van Breda said that though this matter would not interest everybody at the meeting, it was one of considerable importance to those who had to do with drift sands. He would move the following resolution:—"That the Government be urged to take into serious consideration the necessity for taking immediate steps to assist owners of land on which drifting sands are encroaching." Continuing, he said it was not in many parts of the Colony that drift sands were to be seen and therefore very few people were likely to be interested in the matter. They were only to be found in the Coast Districts, and particularly so in the districts of Bredasdorp, Caledon and Riversdale. There were also drift sands at Somerset West, but at Bredasdorp there were certain farms on which these sands had encroached to such an extent that there were grave fears of their being completely wiped out in a few years' time. These sands were entirely at the mercy of the two winds, and unfortunately these two winds did not drive these sands in exactly opposite directions to each other, with the result that the sand was scattered over the farms. Consequently these sands not only made a stride forward but widened as they extended. Not many years ago this question of drift sands was considered to be unsurmountable, but he was glad to say that they had now means of overcoming them. They knew that the Government had lately done good work at Agulhas. The boundary of the light house there was covered with these sands, and about three years ago the Government purchased 80 morgen of that land and planted a third of it with grass, and the next year a vast improvement was seen. It was most gratifying to see that this attempt on the part of the Government had proved a success. Where they had three years ago a mass of sand destitute of vegetation, they now had a beautiful grass field. A great secret of this grass was that the more it was distributed by the sands the more it consolidated the sand. A little more than a year ago the Government sent somebody into the Bredasdorp District to ascertain what the cost of planting this place would be; they then got a survey made and the person who made that survey found that the sand extended from Doornfontein to the Swellendam District. That was about 21,000 acres. That was a year ago but nothing had been done since. Before he concluded he would like to say that in certain parts of the Colony drift sands had been entirely reclaimed, and they also knew that in other parts of the world the different Governments were tackling this question and were doing splendid work. His attention had been drawn to a paragraph in an English paper by Rider Haggard, to the beautiful effect of the reclamation of a portion of the sandy portion of the Coast of England. It was within the power of the Government to assist the farmers who were in a dangerous position. He lived near Agulhas and spoke in a self-interested way. The valuable property on which he farmed was really in great danger, and he had been asked why he did not do something. The fact was he could not afford to do so. The Government had allowed them to use the grass, and to a certain extent they had used it successfully; but he was not in a position to attempt anything like tackling the tremendous expanses of sand which threatened him. He craved the support of the Congress on the question and he hoped they would support him in asking the Government to assist landowners who were not in a position to undertake this work themselves.

The Chairman said he wished to supplement what Mr. Van Breda said. In France a few years ago, there was a very large piece of land of this description which had been reclaimed: the largest in the world perhaps, and it was now a beautiful forest. The Government had planted fir trees and marram grass He felt sure that if the matter referred to by Mr. Van Breda was brought to the attention of the Government, they would assist the farmers.

Mr. Albertyn said he was very pleased to hear that trees would grow on this sand. It was wonderful to see land, which a few years ago was a fertile plain, now a vast sandy desert. These sands had started near the sea and gradually worked their way inland. If it continued to move in the direction it was now moving, it would devastate several fine farms.

Mr. Van Breda's motion was put to the meeting and carried.

ELECTION OF OFFICE BEARERS.

The election of Office Bearers for the coming twelve months was then proceeded with.

Mr. Fincham moved:—"That Mr. Struben be re-elected President." He had always conducted the duties of the Chair in a dignified manner.

Mr. Albertyn seconded the motion.

Mr. Struben said he thanked them very much for the honour they did him in proposing him for the position of President, but he did not think it was right for the same man to be elected twice; and another reason why he could not accept was because he was leaving this Colony for at least a year. If he would be allowed to do so, he would like to propose that the present Vice-President (Mr. Fincham) be nominated in his place.

Mr. Fincham moved:—"That the Hon. A. Douglass be elected to the position." He had had a long experience of public affairs and he took great interest in farming matters, as he had shown by his careful attention to the proceedings of the Congress.

Mr. Lee seconded the motion.

Mr. Ryan seconded the nomination of Mr. Fincham. They all knew the work and trouble he had taken in farming matters and he believed they could not get a better President. Mr. Douglass would make an excellent President, but he did not think it would be right, after the good work Mr. Fincham had done, to pass him over. As Vice-President, Mr. Fincham had been qualifying for the higher position. He thought it was a position that each Vice-President should look up to and expect.

Mr. Fincham said the proposition he had made was in the interests of the Agricultural Union. It was a great honour certainly to be elected President of such a Union as that, but then the interests of the Union should go before personal feelings. He would be glad if he could be allowed to retire in favour of Mr. Douglass.

The Chairman said that Mr. Fincham had done a lot in the interests of that Union and he had been for a time Vice-President, and being Vice-President he naturally thought that the position of President should be accorded to him. He need hardly say that he recognised the fact that Mr. Douglass would make an admirable president.

A vote was then taken on the matter, when Mr. Douglass was elected.

Mr. Douglass said he would like to return thanks to the Union for the honour they had conferred on him in electing him President for the forthcoming year. He regretted that Mr. Struben could not see his way to continue in the Chair as it would be an important year and his experience would be of great use to the Union. He much appreciated the great courtesy of Mr. Fincham and the nice way in which he spoke. He thought indeed that he would have made a better President than he (Mr. Douglass) would make. He took the opportunity of proposing him for the Vice-Presidency.

Mr. Brown seconded Mr. Fincham's nomination. He thought he was in a better position as Hon. Secretary of the Union to speak of Mr. Fincham's good work than anybody else. They could not have had a better worker in connection with the Union than Mr. Fincham. He hoped the day was not far off when they would see him in the Presidential Chair.

As no other nominations were received Mr. Fincham was duly re-elected Vice-President, and he briefly returned thanks for the honour conferred on him.

Before proceeding with the election of the Executive, Mr. Lee raised the point as to whether it would be advisable to have 9 or 12 members.

Mr. Brown suggested that the number be made 12.

The Chairman—No, I am superstitious.

Mr. Brown—It won't be 13 because there will be the President and the Vice-President.

Mr. Lee moved that the following gentlemen be appointed on the Executive :—

EXECUTIVE COMMITTEE.

F. C. Bayly, H. H. van Breda, D. M. Brown. H. Cloete, M.L.A.' O. E. G. Evans, the Hon. A. J. Fuller, M.L.A. (Minister of Agriculture), C. G. Lee, the Hon. P. W. Michau, M.L.C., P. R. Malleson, J. Rawbone, P. Ryan, the Hon. Dr. Smartt, M L.A. (Commissioner of Railways). Government Representatives :—The Under Secretary for Agriculture, the Colonial Veterinary Surgeon, Government Entomologist, the Agricultural Assistant, and the Editor, *Agricultural Journal.*

PAST PRESIDENTS.

Mr. Fincham moved :—"That all past Presidents of the Agricultural Union are hereby elected Hon. Presidents." He said he thought it would be an excellent thing to do as it would be conferring a great honour on the gentlemen who had taken such keen interest in the Union.

Mr. Evans seconded the motion, which was unanimously carried.

PATRONS.

Mr. Fincham moved :—"That His Excellency the Governor be requested to allow himself to be nominated as a patron of the Agricultural Union." Mr. Geard seconded the resolution, which was also unanimously carried.

SUB-COMMITTEES.

Mr. Lee moved :—"That the Executive Committee be empowered to appoint Sub-Committees, not necessarily members of the Union, for the object of assisting with the subject of co-operation to enable the interests of each section of the farmers to have the best attention."

Mr. Geard seconded this resolution, which was also carried unanimously.

Mr. Fincham moved:—"That a bonus of thirty guineas be voted to the Hon. Secretary for clerical assistance." He said they all had to acknowledge that he had done splendid work during the past year.

The Chairman seconded the motion. He said he thought it hardly necessary to bring to the notice of the Union the fact that Mr. Brown had worked so hard for Agriculture, as it was easily perceivable from the way in which the Congress had been arranged. He thought the thanks of the whole were due to him.

The Hon. Secretary thanked the Congress for their contribution, and said he did not want the money for himself, but that he could not be expected to be out of pocket for clerical assistance.

A Vote of Thanks to the Town Council of Cape Town, for the great assistance they had rendered the Union in their sittings, was carried unanimously.

A Vote of Thanks was also accorded to the Western Province Agricultural Society for their assistance during the sittings of the Congress.

Mr. Lee moved:—"That all matters on the Agenda Paper, not dealt with, be handed to the Executive to deal with." He said there were several matters which had not been dealt with and were of great importance to the country.

The Irrigation Bill.

The Chairman said that although the Irrigation Bill was down on the Agenda for discussion, the Congress would not be able to deal with it. He had read the Irrigation Bill from A to Z and he had written a lengthy report on it, on behalf of the Agricultural Society. He did not think the Bill, as it stood, was acceptable to the country. He did not think there was any fear of its being passed this session of Parliament, as there were so many contentious clauses in it. He hoped delegates to the Union would make themselves acquainted with the Bill by the time the Congress met again.

Dodder and Lucerne.

Mr. Evans moved:—"That the Government be asked to have dodder parasitic on lucerne placed under the Obnoxious Weeds Act." This was agreed to.

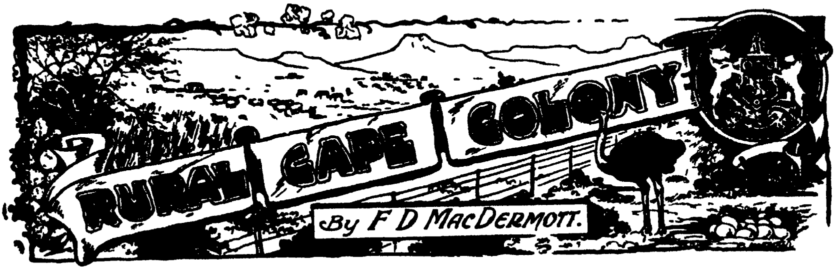
Mr. Lee moved:—"That the attention of Government be called to the necessity for the presence of at least one of the staff of Veterinary Surgeons and one of the assistants of of the Agricultural Department at all Agricultural Shows, in case of reference to technical matters." This resolution was also carried.

Coming Congresses.

Several delegates having expressed a desire to have the Congresses held earlier in the session of Parliament, it was decided that the next Congress should be held during the first fortnight that Parliament sat.

Mr. Brown moved a Vote of Thanks to the President, Mr. Struben, and referred in eulogistic terms to the way in which he had filled the position since his election.

The vote was unanimously carried, and the proceedings of the Congress terminated.



NO. XV.

IN THE DISTRICT OF UITENHAGE.

FLOOD IRRIGATION IN THE SUNDAYS RIVER VALLEY.

Sundays River is a vague term to those who do not know the Midland Districts of the Colony, and to those who do, it is more of a generality than a specific area. The river itself is one of the many intermittent streams that have their sources in the Upper Karoo and at times bring down the storm waters from those parts to be utilised at the lower levels—where there is energy sufficient, and the conditions are favourable—or carry their vast volumes to the sea. It rises in the mountains around Graaff-Reinet and, flowing through a large part of that district, passes through the Jansenville District just to the north of the Klein Winterhoek Range of mountains, winds its way between that range and the Zuurberg into the district of Uitenhage, and from there, through Addo, it empties into the sea in Algoa Bay, a little to the north of the important town of Port Elizabeth. It is necessary to call attention to these topographical details in order to make clear the position of one of the largest and most promising of the many irrigation schemes which are now attracting interest in agricultural circles in this Colony. A careful study of a large scale map will reveal the fact that the Sundays River, after entering the district of Uitenhage, winds through a long poort which bears its name; this poort, or valley, being formed by the two mountain ranges mentioned above. The Zuurberg from this point onwards holds its stately way eastward towards the sea, but the Klein Winterhoek Mountains gradually subside into the high range of hills which carry the Port Elizabeth-Graaff-Reinet Railway. The Sundays River Poort ends on or about a point marked as Korhaan's Drift. And it is to the region just below this that I wish to draw particular attention, for here is situated the

STRATHSOMERS IRRIGATION ESTATE.

To reach this busy centre of cultural activity one has to book to a station on the Graaff-Reinet line known as Bluecliff, from there a short cart journey of about six miles, over a road that might be improved for comfort, and one arrives at the Valley itself in which the estate is situated. This spot is now known as Bayville and boasts a post and telegraph office, a couple of small shops and a site for a railway station, with a suspension foot-bridge across the river. After leaving the mountains and working in between the two ranges, the Sundays River seems at one time to have formed a large lake or lagoon at this spot, for as one descends the hills a huge expanse of alluvial land stretches out on either side, extending, with slight undulations, for several miles in width, and many more in length. Homesteads dot the entire landscape. How these rich deposits were formed, however, is beside the object of this article. There they are, and Dame Nature having so kindly prepared the way, it follows as a matter of course that it only needed energy and intelligence to bring a prosperous and happy community into existence. And, though so little is heard of this section outside its own immediate neighbourhood, one glance at the photographs reproduced herewith should convince even the sceptics that both attributes have been attained by the cultivators of this valley. These general views of the valley consist of three sections of what was originally a panoramic view of that part of the estate which has been brought under cultivation. The first is taken looking up the river, the second across in a northerly direction with the river at the feet of the spectator, and the third shews that section of the estate on the lower reaches of the river which is now rapidly being brought under the plough and irrigation furrows. But even these extensive views fail to adequately depict the beautiful scene when viewed from the krantzes on the southern bank of the river. The holdings seem to form a large, wide-spread village instead of so many farms. The mountains seen in the background are the Zuurberg Range, and as they are heavily bushed, nearly to the summit, form a very striking portion of the attractive scenery hereabouts. In the first and third sections of the view the river itself can be seen winding below the banks, with a fair supply of water, even though the season is dry. The cultivated lands which show up like an English landscape are practically all lucerne, with a small proportion of cereals and potatoes, and here and there a patch of orchard. For one of the great charms of the Valley is that anything and everything seems to thrive if only cultivated with ordinary care and attention. There is, in fact, so far as I could learn,

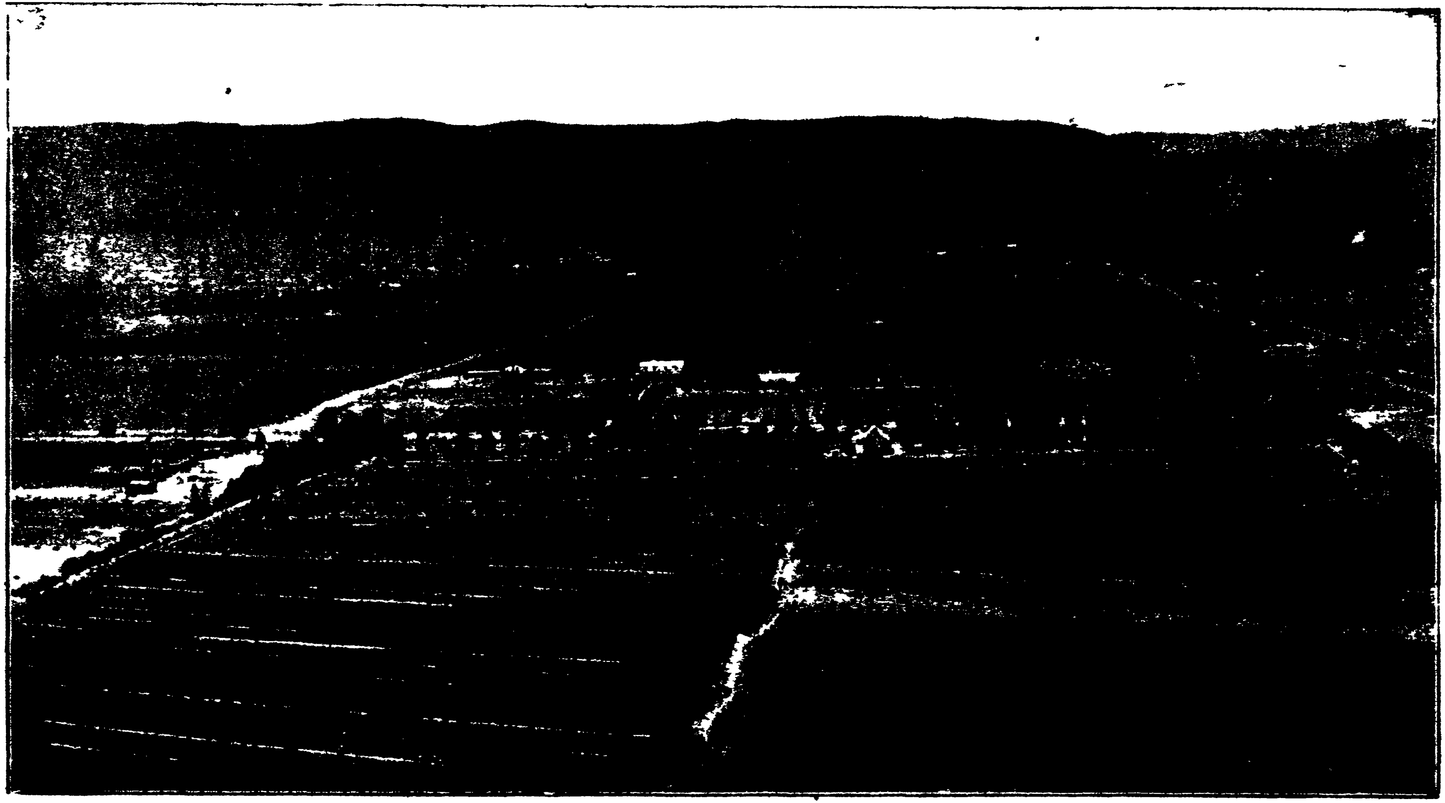
ONLY ONE DRAWBACK.

And that is one that is inseparable from the conditions which have created the place. The river is intermittent, and it is only during flood times that its waters are available for irrigation. As the average rainfall is very light indeed, and the soil, though very rich, is friable and loose, a great deal of water is needed for successful cultivation. But even with this one drawback the men who are settled here are quite satisfied with their conditions, as a rule, and have learned to make the most of what they can get. Except in abnormal seasons the river can be depended upon to supply quite sufficient, and a great deal more than is absolutely necessary, for the wants of every irrigator on its banks at the present time. Like all rivers that rise in the Karroo it is subject to sudden and violent freshets, and as the drainage area is very large indeed, extending as far as the Sneeuwberg in the north, and includes the country between the watershed of the Kareiga and Groote Rivers on the west, and that of the Fish River on the east, it stands to reason that when the Sundays River does not flow, a very large area of the Midlands is exceedingly dry. But conjecture apart, though no regular observations seem to be obtainable, the records show that for many years past the only really bad seasons experienced in the valley were those in which the river failed in the spring when water is most needed. That was some years ago before the irrigation had been so widely spread, and now, it is said, the river, below the irrigation levels, is never known to actually fail; which has caused several of the irrigators to erect pumping plants to meet any deficiency. But with that I shall deal later on.

THE STORY OF THE ESTATE.

To fully appreciate the present position of this very interesting property it is necessary to first give a short sketch of the estate from the inception of the irrigation scheme to the present time when it will be seen that it has passed through some very trying ordeals. The farms were originally secured for irrigation purposes by the late Mr. J. Kirkwood. a prominent and very keen business man of his day in Port Elizabeth. He first saw the enormous potentialities of so favourably situated a property, and knowing the richness of the soil, which is practically all Karroo silt—set to work to develop it as an irrigation estate by erecting weirs to turn the flood waters of the river on to the lands. He succeeded up to a certain point, but it was a heavy load for one man to carry. Some idea of the magnitude of the scheme may be formed when it is stated that the extent of the property is 27,000 morgen, of which 1,000 morgen or thereabouts

1.—Bayville (Sundays River) looking North-west.



2.—Bayville (Sunday's River) looking North.

are at present under irrigation, while it is estimated that the completed scheme will bring between 3,000 and 5,000 morgen under water. Mr. Kirkwood, however, did not, unfortunately, live to see the realisation of his dreams, and at his death the property fell into the possession of the Guardian Assurance and Trust Co., of Port Elizabeth. As the business of that Company precluded, to some extent, concentrated attention on this particular asset, it does not seem to have advanced very rapidly while in their hands. A great deal was done, however, to forward its legitimate destiny as an irrigation estate, and a goodly number of farmers settled there and did well. The bulk of the property was laid out like a village settlement, the holdings running from ten to a hundred morgen and upwards. But quite recently a new company was formed for the express object of taking over the estate and making its development the main object of its existence. This company is known as the Strathsomers Estate Co., Ltd., its principal shareholders being prominent citizens of Port Elizabeth and Grahamstown, among them being the Hon. John Pyott, M.L C., Mr. Henry Wood, M.L.A., Mr. John Whyte, Mr. J. Scrimgeour, Mr. D. M. Brown, and other well-known individualities—while some of the shares are held by proprietors on the estate. Since this company took over, things seem to have improved and more energy has been directed to the work of development. Under the old regime there was a good deal of discontent among the irrigators—both tenants and proprietors—with regard to the supply of water, and this culminated at one time in an action in the Eastern Districts Court, in which the irrigators did not succeed in their contentions. It was to this legacy that the new company succeeded, and there have been a few hitches even since they took over, but everything is being gradually smoothed away now, and in a short time the larger schemes which have been planned should be coming to fruition. The new company has got rid of most of the available land at present under the furrows, and looks forward to the time when further extensions will render larger sections available for irrigation when a much larger area will be thrown open—and, I understand, on very reasonable terms. Previously the lands were sold outright with an undertaking by the company to provide water at a fixed rate per morgen per annum. The new regime has improved on that by letting the lands on perpetual quit rent with the right of capitalising on a fixed basis at any time. The water charge is also retained but has been raised.

THE IRRIGATION WORKS:

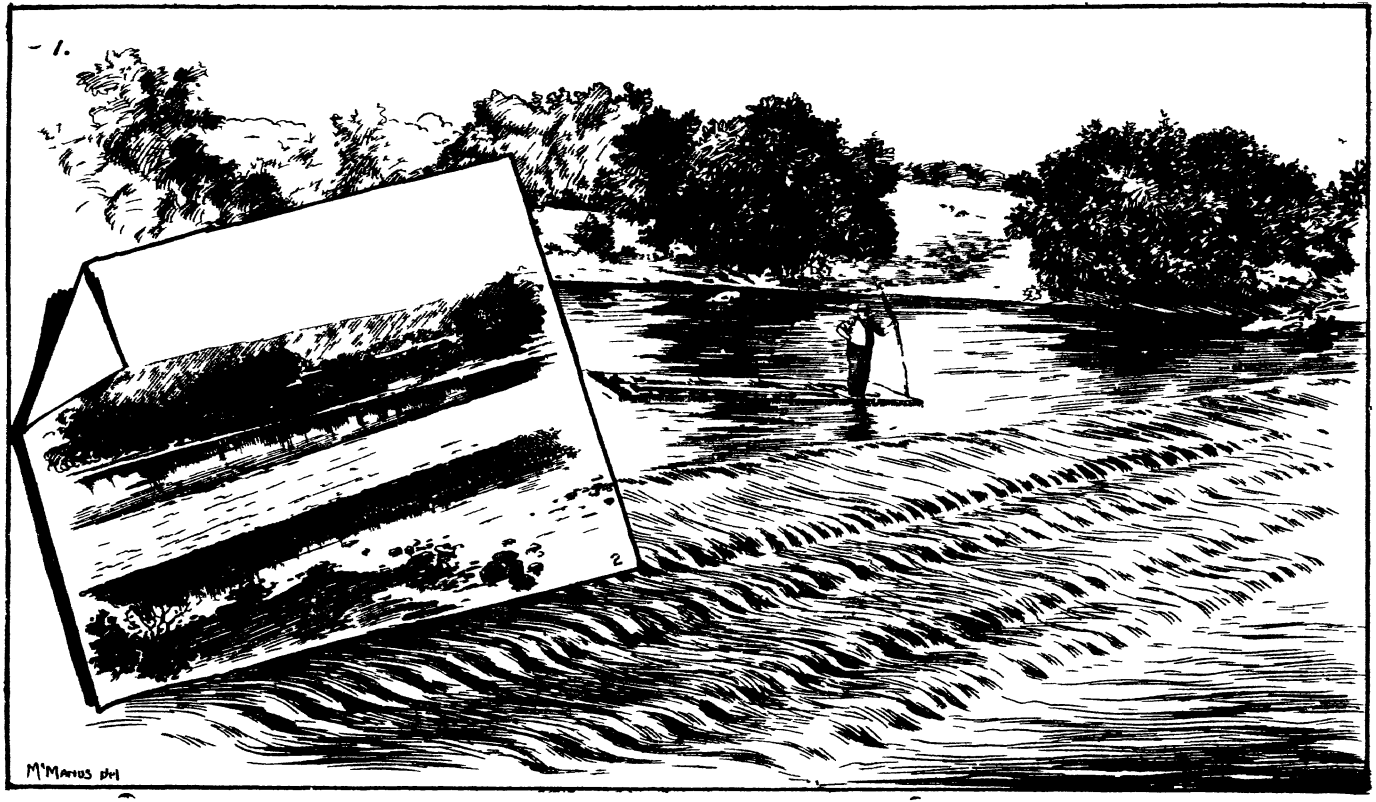
The river, as it runs through the estate, may be taken roughly as averaging just over a hundred feet wide, and the fall is estimated at ten feet to the mile over the sixteen miles of the river's course through the property. The banks run about eighteen to twenty feet high, with, in places, goodly stretches of very rich mud flats, behind which another rise of ground carries the flood banks higher still. No attempt has been made so far to erect anything approaching permanent storage works for water, partly owing to the expense, and partly owing to the friability of the banks and the difficulty of getting foundations. It was this set of conditions which brought about most of the trouble which has been experienced on the estate. The whole property, or rather the irrigable portion of it, is now watered from two weirs, which are situated some two miles above the middle part of the cultivated sections. The upper one, shown in the illustration herewith, is known as No. 1 Weir, and was the cause of much trouble for a long time, and was partly washed away when the present company took possession. The management was then in the hands of Mr. O. P. P. Hoole, under whose directions the present structure was completed. This is what is now known among irrigation farmers in this Colony as a "wire dam." That is, as the foundation is so unreliable, strong stakes or anchors are set in the bed of the river, to which are attached fairly heavy wires. These are then laced up with other wires to form a large powerful net, the mesh being about 9 in. square. This net is then partly filled with heavy stones laid in the form of a dam, and when the work is far enough advanced, the portion of the huge network, left specially for that purpose, is folded over and the whole thing, being finally laced together, becomes a fixture, for no part can be carried away unless the whole goes. In addition to the precautions mentioned here, the surface of this weir is cemented over roughly in order to guard against percolation, so that the stones and rubble, beside being held together by the powerful netting, are further cemented up to prevent displacement. This weir has proved so far very successful, and there are very few doubts as to its ability to withstand the heaviest floods.

No. 2 Weir, which is also illustrated on another page, is constructed differently. It is built of concrete, and forms a low, square-set wall about three feet thick on the top. I have not the foundation measurements. The down stream side is supported by heavy planking, supported by fairly heavy timbers set deep in the bed of the river, and strutted as shown in the illustration. Each of these weirs feeds a set of furrows leading from both banks of the stream to the irrigation lands lower down. There are some fourteen miles of main furrows, ranging from 12 ft. to 7½ ft. wide. The branch furrows range from 4 ft. to 5 ft. wide. It would be difficult to even estimate the length of the branch furrows, for they seem to be everywhere, no matter where one turns on the estate.

THE DIVISION OF WATER.

Where there are so many interests to serve, the question of the division of the water becomes a serious one. The system now in vogue is to allow each irrigator a recognised turn. That is to say, that for every fourteen days the river runs—presumably when it reaches the level of the intakes and fills the furrows—each irrigator is allowed three hours per morgen. Of course there are troubles and disputes, but, as all the water is under the control of the company,

3 —Bayville (Sunday's River) looking North east



Irrigation Works at Bayville (Sunday's River)

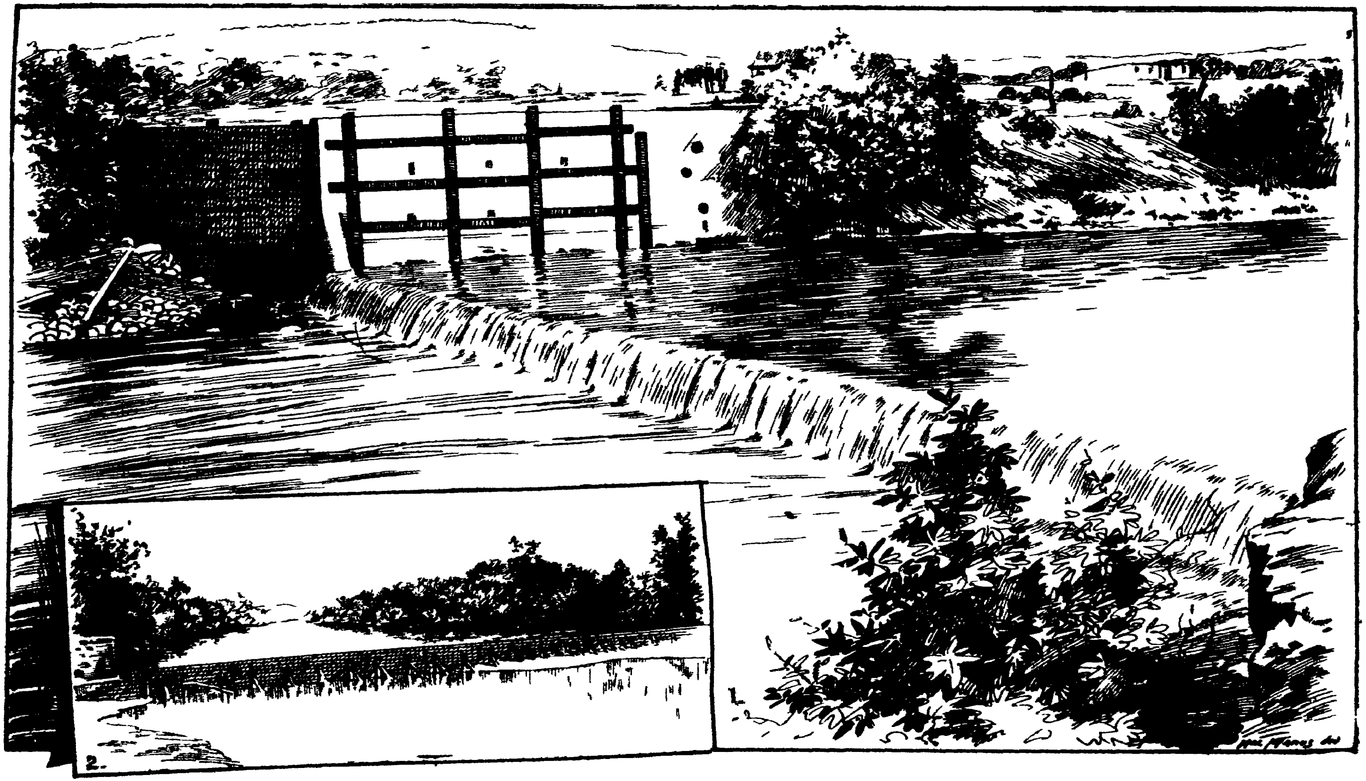
No 1 Weir.—Large view shows River in flood. Small view shows normal river with details of the dam and the manager acts as water-bailiff, these are minimised as far as possible. From what I could gather in conversation with some of the leading irrigators on the estate, and the present manager, Mr. Cruickshanks, the system seems to work fairly satisfactorily, though, no doubt, as the larger schemes are brought into being, some at least of the existing troubles will be still further smoothed over. But when one comes to be assured that even in existing circumstances the irrigators average something like seven wettings per annum for all their lands, there does not seem to be much room for real complaint. One cause of the uncertainty is the suddenness with which the river rises and falls at times. This has to be expected of course when the stream is fed practically by rain-storms on the mountains and Karoo. An advantage which seems to be undoubted, however, is the absence of really serious floods. Reports state that the river has risen as high as thirty feet, but I could obtain no positive records. There were floods of noticeable severity in 1895-6, and again in February, 1898. But the heaviest flood spoken of by old inhabitants is that of 1869, which was followed by another heavy flood in 1874. So far as I could learn, the flood level has never seriously threatened the crops, for, being mainly lucerne, they are not so easily damaged as cereals. The great risk with lucerne, under flood waters heavily charged with silt, is that the plants may get choked before the silt can be cleared away or the ground sufficiently cultivated to get air to the plants again. And of this there seems no record of damage to any extent.

THE IRRIGATION FURROWS.

As will have been gathered from the foregoing, the whole of the Irrigation Scheme, like the immortal "Topsy," seems to have just "growed." Had the Estate been laid out from the first to meet the demands of a really large and comprehensive scheme, there can be little doubt but that much more satisfactory results would have been obtained. The main furrows, or canals, would undoubtedly have been constructed on a more liberal scale and they would have been so graded as to take more advantage of the natural fall of the river. This could have been done by carrying the weirs higher and raising the level of the intakes. A good deal of excavation could also have been saved had this been done. As it is, the main furrows are very deep at the upper ends with the accompanying trouble of silt and damage by the occasional subsidence of the banks. The friability of the soil all over the Estate makes these subsidences matters of too common occurrence and in time, no doubt, special precautions will have to be taken to prevent them. The roads, too, cross the main furrows in many places without any protection for the furrow, with the result that a good deal of damage results from the traffic, especially if it is heavy. The system of upkeep for the furrows seems hardly satisfactory, either. It consists of an undertaking on the part of each owner or tenant to maintain the furrows on his own land and all main furrows passing either through or by his property. It stands to reason that such an understanding can easily be read with an elastic mind. It should have been recognised long ago that the maintenance of the main furrows ought to be the duty and responsibility of one central authority, and as the company retains all rights over the distribution of the water to itself, it stands to reason that the most satisfactory arrangement would have been for that body to maintain the furrows. It might be arranged in another way by levying a small rate on all irrigated lands, and the irrigators appointing some responsible person to supervise the work. The present arrangement can never give complete satisfaction, for, as the system extends, one man neglecting his duties, or several doing the work of maintenance and cleaning in a slovenly manner will bring about very great losses indeed on their neighbours. It has to be admitted that considering all the conditions which have attended the development of the Estate a great deal has been done in the right direction, particularly of late. Some good fluming has been set up in places to carry the water over depressions, and though the sluices in general use might be improved upon, that is a consideration which will have to be reckoned with later. On an estate like this every effort should be made to secure uniformity as far as possible. In the matter of sluices for instance one would have thought that a uniform pattern would have been adopted if only on the score of economy. It is cheaper to procure a large supply of any article of the one pattern than to get single samples each made differently. These remarks apply to a great many other things on the estate and I have no doubt they have struck others beside myself and will be more fully considered in the future. The new company might do a great deal for its tenants, and those holding freehold lands on the estate, by offering facilities and assistance to carry out some form of co-operation in the direction indicated.

THE DEVELOPMENT SCHEME.

The scheme which has been adopted for the further development of the estate includes a rather ambitious design for taking out the flood waters of the river at a point much higher up than the highest weir now in use. I have mentioned a place known as Korhaan's Drift, in the earlier portion of this article. The valley at this point is much narrower and it is believed that a weir can be erected here which will be of much more service than the two lower ones. In the first place the prospects of getting good foundations for a permanent work are more assured, and in the second place as the situation of this weir will be much higher than the others it will be possible from this point to carry water over a much larger area of the property. It is anticipated that anything between two and three thousand extra morgen of good land will thus be brought under water, which will mean a great advantage not only to the company, but to the whole valley. The experience of the past shows conclusively that the more flood water taken out of the river and spread over the land on either bank the more constant is the flow of the stream below the irrigation level. This fact has proved of great



Irrigation Works at Bayville (Sundays River)

No. 2 Weir.—Large view shows stream in flood The small view shows construction of the Weir, River normal

Apple Trees in bearing (four years old) at Bayville (Sunday's River.

advantage to many of the irrigators who now pump water from the river when the flood waters are scarce and thus save many a crop which might otherwise be lost to them. But pumping is expensive work, even with oil engines, and if it could be avoided everyone would be the better pleased.

Possible Storage Works

One of the most interesting features about this extension scheme is the possibility that it may lead to the consideration, later on, of the feasibility of constructing storage works of some kind or another. It must be very exasperating for a farmer to have plenty of water when possibly he cannot use it, and, when it would be invaluable to him, to find that the river remains obdurately low. And when one comes to calculate the possible cost of such a state of things with the six or eight thousand acres of irrigable land all bearing valuable crops, the provision of storage begins to look remarkably like a sound commercial proposition. The difference between water at command and water only when you can get it, is incalculable in such a case as this. It should be well worth enquiring into—as something to be thought of seriously later. But for the present the proprietary company has plenty of scope for its activities in carrying out the beginnings of the extension scheme now in hand, and it will be good news indeed to hear that the new works have been started.

Rail Connection with Bluecliff.

Another matter which is attracting attention is the need of direct rail connection with the line at Bluecliff. It is only about six miles and with the traffic at present passing in and out of the valley it is estimated that there is more than sufficient to pay the working expenses of a light line. This, I was pleased to hear, is also included in the developments contemplated, but will probably be taken up by a separate company in which some of the more prominent shareholders in the estate company will be largely interested. All these things make for success, and where bulky products have to be dealt with, the transport facilities cannot be too good. At present the main crop of the valley consists of Lucerne which is largely marketed as hay. What the future may bring it is not easy to say, but for many years to come it is very certain that lucerne hay, for which an excellent market always exists, will be one of the primary products of the valley, so that any railway scheme projected can depend upon plenty of bulky freight to fill up with.

There is some talk ot creameries and factories being erected in the valley in order to turn the cultural products into the manufactured article, and thus market the products of the soil in the highest possible form, and no doubt in time this will come about; but even that development should not influence the prospects of the proposed railway very much. The more factories, the more bulk in the output for the railway to carry.

The Cultural Outlook.

What may be done in the future in the shape of dairying and fat stock for the butcher is as yet an unknown quantity. One of the problems to solve will be the probability of stock diseases invading that region. Heartwater and horse-sickness are credibly believed to exist, so that merino sheep would be barred, but there is nothing to prevent Persians being tried. Legend has it that years ago large flocks of merinos were grazed in the highest portions of the valley, but they have mostly disappeared. The natives seem to keep goodly flocks of Afrikander goats, and excellent specimens they are. There are not many cattle in the valley at present, possibly owing to the prevalence of redwater in the past, but with the modern system of dipping and inoculation it should not be a difficult matter to introduce immune herds, and soon get them established. There is excellent grazing in the bush-clad hills on either side of the valley, there being any amount of spekboom (Portulacaria) and other edible bushes among the natural vegetation. Pigs should do particularly well here.

But for many years to come the principal occupation of the cultivators in this valley will be the production of Lucerne Hay, combined with a little orcharding. Lucerne is the natural crop of this region. The soil of the valley is a very deep light loam, having been tested in places to over forty feet in depth. It is well supplied with plant food, and is rich in lime. The drainage is well-nigh perfect; in fact, if anything, the subsoil water gets away a little too quickly, but this can be partly remedied by cultivation. As the whole of the alluvial consists practically of Karoo silt, rich in organic matter, overlying boulder drift brought down by the river, it is difficult to imagine anything much better. It must also be remembered that each "wetting" leaves a layer of valuable silt on the land, ranging from an eighth to a quarter of an inch in depth. This means, practically speaking, an inexhaustible soil, as it is constantly being renewed.

The system of raising lucerne here is that known as "beds." That is, the land is carefully cultivated and levelled in sections or "beds" before being seeded and the sections are so laid out that when the irrigation waters are let in they soak gently through and thus give the lands a thorough wetting. In favourable seasons as many as six cuttings a year are taken off the fields thus laid out, and as high as ten tons to the acre in dried hay has been recorded from well-established crops. The first year the crops are small, say from two to three tons of hay per acre, but after that the weight per cutting increases very considerably as the plants become older until about the third year they begin to give the maximum. The lucerne here is practically speaking broadcast sown and the result is a plentiful crep of weeds and grass in some of it for it is not all as carefully attended to as it might be. But for all that the bulk of the crops from the Valley are well-turned out and command good prizes always. When I was there the current rates were £6 10s. per ton. for lucerne hay delivered at Bluecliff.

The system of haying presented no new features. The climate is very favourable to this operation as there is so little rain. But what does fall generally comes in the spring and summer in the shape of thunderstorms. Horse-mowers are in general use, there being several makes to choose from. The two most prominent I saw were the Albion (Harrison, McGregor, & Co.,) and the Massey-Harris. Each has its supporters, but the gearing of the Massey-Harris was spoken of as a very favourable feature. The lucerne is cut and left in the swathes to dry, then raked into windrows with a horse rake where it is left for a while, then stacked, and baled as wanted. The "Eli" baling press is mostly used. One large producer, Mr. B. K. Mayo, shewed me an excellent installation driven by a fairly large "Otto" oil engine.

Ostriches form a feature of farming in the Valley as they thrive so well on lucerne, excellent flocks of birds are to be seen there. The practice of grazing the birds on lucerne fields is not so common here as in some parts, it being recognised that the lucerne is not improved thereby.

Cereals, except mealies, are not much grown. Oat-hay for fodder purposes appears as a catch crop and green barley is also grown. Wheat is not much sown now, through large crops have been harvested in times past. Potatoes do very well, but are troubled with the tuber moth.

ORCHARDING.

Orcharding on a large scale has not been introduced into the Valley as yet, the largest grower being, perhaps, Mr. John Whyte,—who, by the way, is chairman of the company, and cultivates a goodly stretch of land. His fine two-storey residence stands out prominently in its picturesque surroundings of ornamental trees, with its avenue of Californian palms, through which the carriage drive passes. Mr. Whyte has succeeded fairly well, his orchards, so far, having a very promising appearance. They comprise most of the popular varieties of stone fruits, such as plums, peaches, etc., while apples and pears are also a strong feature. All seem to do well, doubtless because of the richness and depth of the soil. Citrus fruits form a very important section and when they all come into bearing the output should be something considerable. Citrus fruits of all kinds do very well in the valley and are becoming a favourite crop.

As evidence of the productive nature of the soil I took the accompanying photographs which shew one of the irrigators standing by his young apple trees. Mr. Richards has been singularly successful in winning prizes with this fruit which is undoubtedly very fine. The size of the fruits on the trees shews this. It is an apple of the Warner's King type grafted on a resistant stock and certainly thrives apace, for the largest tree is but four years old and was fruiting heavily at three years. At the last Bayville Show it beat all comers, some of the fruits weighing 27 ozs each, and measuring upwards of 16 inch. in circumference. Mr. Richards is a

West of England orchardist and has little patience with the modern idea of pruning and other cultural "fads." He maintains that it is better, with a hot, dry summer, such as they have in the valley, to leave the weeds and under-growth on the ground as it prevents sun scorch by heat radiation from the bare soil. But he has not, as yet, demonstrated the soundness of his beliefs on a commerical scale.

Among the other trees that seemed to be doing well I noticed the grevillea, which flourishes apace; and the macrocarpa and other cypresses

Tree planting—other than fruits—has not as yet played a very important part here.

Tobacco does well, but has not been attempted on a large scale either.

POPULATION AND ENERGY.

The population of the valley is fairly large, as may be gathered from the foregoing notes. Of Europeans occupying holdings there are at present about sixty, counting the freeholders, and tenants with option of purchase. Of course these are equal to more than this number of families, for there are a number of others who make a good livelihood by other means as well. In addition there are between 130 to 140 native tenants, who occupy dry lands and help on the farms. A strong Agricultural Society is in full swing, and a live Farmers' Association, so they are far from an idle group.

There are about a dozen pumping plants on the river, principally of the centrifugal pattern, driven by oil engines. Of these the Hornsby oil engine seems the most popular, there being seven or eight of them at work, a couple of Crossley "Otto" type, and two Clayton and Shuttleworths.

Among those whom I have to thank for information and assistance, are Messrs. John Whyte, R. Cruickshanks (manager), O. P. P. Hoole, Frederick Frank (an old and valued contributor to the *Agricultural Journal*), B. K. Mayo, Richards, Jurgens, Vernon, Rushworth and others.

DIPPING vs. SPRAYING.

THE DOUGLASS CONTENTIONS CRITICISED.

By Llewellyn J. Roberts, Cottesbrook, Adelaide.

I have read with some interest the remarks of the Hon. A. Douglass, *re* the above question, at the Agricultural Union, and also a paper read before the Koonap Farmers' Association by Mr. Douglass, jun., as reported in the *Agricultural Journal,* and I feel that I would be failing in my duty as a Colonial farmer who has the eradication of ticks at heart, if I allowed these expressions of opinion to go unquestioned. The Hon. Arthur Douglass deserves every credit for his efforts in not only eradicating ticks from his farm but also trying to get his brother farmers to take the same commendable course. But now that dipping has come to stay,—and I think I am right in stating that it has displaced spraying on almost every farm except that of Mr. Douglass—why Mr. Douglass should shut his eyes to facts, and exaggerate differences in favour of spraying whilst overlooking the overwhelming advantages of dipping, I cannot tell, unless it is that Mr. Douglass has really not given dipping a thorough trial, and is therefore really ignorant of its advantages.

Mr. Douglass states that 60 or 70 head of cattle can be sprayed in an hour, and that his 500 head are finished by 11 a.m. adding that he begins early. A simple calculation shows that he must begin *very* early.

My experience, and I have been spraying for three years, is that 60 or 70 head *may* be rushed through the race, spraying only the underparts of the animal, but it cannot be kept up. I reckon 300 head is a very fair day's work if done conscientiously, and that is spraying only the *under parts* of the animal. If the whole animal was wetted from tip to tail, 500 head would take at least two days to do thoroughly.

Now I have stood with watch in hand and seen cattle going through a tank at the rate of 12 a minute, in other words 750 an hour. I have just this minute returned from my tank after putting through 120 head in 11 minutes including several minutes' delay in turning on the second lot.

I am well within the mark in stating 1,000 head can be dipped with ease in the time it takes to spray 200 head, and when it is considered that there are 26 dippings a year, if fortnightly dipping is done, speed and ease of handling counts for something.

But speed is not the main consideration, my principal reason for abandoning spraying in favour of dipping is that no matter how carefully, how conscientiously, the spraying is done, parts of the animal escape a wetting, and with it hundreds of ticks capable of laying thousands of eggs, which are bound to keep up the veld infection, and so one goes on spraying year after year, without coming to the end of the ticks.

Mr. Douglass admits he has been spraying for seven years.

Now, with dipping, no matter how the cattle are rushed through, if the tank is properly constructed, every tick gets a wetting.

I admit up to the present no dip has been found that will kill every fully fed female Blue tick, but it must be remembered that the Blue tick is on the animal for about a month before it is fully fed and must at least have had one dipping, if not two, before it arrives at that stage.

This is the theory, but in practice it is found that after about the third dipping the cattle become free of ticks, and after all "the proof of the pudding is in the eating."

Mr. Douglass thinks dipping costs just about as much as spraying. Mr. Douglass, jun., makes the following estimate of spraying in his paper :—

Cost of Spraying 100 *Head.*

25 per cent. paraffin, 75 of water.			s.	d.
1½ cases paraffin (12 gals.) at 10s. per case .			15	0
Less sale of box 6d., 3 tins, 9d. .	1	3		
Paraffin recovered, say, 1 tin ...	2	6		
			3	9
			11	3
Cost of labour, water, etc.			3	0
			16	3

From this I see that he reckons 32 gals. to 100 head (1½ cases oil equal 12 gals. plus 36 water, less 5 gals. oil and its 12 gals. water recovered, equals 32 gals. to wet the 100 head). This I think too low, and the recovery of 1 tin of paraffin out of three used is altogether too high. However, taking this as it stands—16s. 3d. for 100 head.

Here is my estimate for dipping, say, with Fletcher's dip—(I hold no brief for Fletcher's Dip, nor have I used it, but I believe it is as effective as any other) :—

Cost of Dipping 100 *Head.*

	s.	d.
32 gals. dip at ¾d. per gal.	2	0
Labour, 4 boys at 2s. each, one-sixteenth day ...	0	6
Cost of 32 gals. water where it is very scarce ..	0	6
	3	0

Neither of these estimates includes the interest on cost of plant, nor does the estimated cost of spraying include the renewal of hose (an expensive item), but the following will shew how soon a tank may pay for itself.

Mr. Douglass has sprayed his herd of say 500 head for 7 years, approximately once a fortnight, this at 16s. 3d. per 100 head will have cost him £739.

If he had dipped them instead it would have cost him a total of £136 at 3s. per 100 head.

£739
Deduct 136

leaving £603, which would have built a good tank at £150 and supplied the cost of dipping 500 head for a further 23 years !

Not to speak of avoiding the trouble and expense of carting the paraffin tins to town to sell at 3d. a time.

To repeat, my point is not the cost, not the speed—though these things count in frequent dippings—but the ability to *wet every portion of the animal;* and I contend that in spraying this would not be done.

I admit dips are not perfected yet, and that the use of a deadly poison is fraught with some danger, but up to the present I have had no loss and my cattle have been through most arsenical decoctions, including eight consecutive WEEKLY dippings in Demuth's without any apparent injury, and, I feel sure, with proper precautions no accident need occur. *And my cattle are cleaner after dipping than they were after spraying.*

Spraying is a thing of the past for anyone who can afford a tank, and it is only a very poor substitute for the man who cannot afford one.

I agree with Mr. Douglass that public dipping tanks, except in special cases are so much waste of money. They will in time become the centres of infection for every disease in the neighbourhood.

Mr. J. Rawbone's Prize Ayrshires, winners of the group class at the Port Elizabeth Show.

MR. J. RAWBONE'S PRIZE AYRSHIRES.

THE GROUP CLASS WINNERS AT PORT ELIZABETH.

On the opposite page is reproduced an excellent photograph (taken by Messrs. Watson) of the group of Ayrshire cattle that won the prize for that class at the Port Elizabeth Show. They are the property of that well-known breeder, Mr. J. Rawbone, of Broadlands, Sir Lowry's Pass, who has done so much to introduce this hardy tribe of prolific milkers to this country. The Ayrshire is rapidly growing in popularity and with the extension of dairying is bound to be more and more in demand. In the West and South-West those farmers who have taken up dairying and have tried the Ayrshire speak very highly of its adaptability to the climatic and other conditions prevailing in those sections. The Eastern and Northern Provinces should suit it equally well, as it is hardy and profitable; and though comparatively small in appearance gives a good butcher carcase in addition to its undoubted advantages for dairying purposes.

The following is a list of the cattle as numbered below the illustration:—

1.—Bull under one year. "BEAUFORT." *Sire*: "Osborne of Auchenbrach"; *Dam*: "Lottery V." ("Lottery V" was a winner of six prizes at different shows.)

2.—Bull. "OSBORNE OF AUCHENBRACH." A.H.B. vol. 24, 4525. *Sire*: "Bobbie II of Preesmax"; *Dam*: "Fleckie of Dinning." Imported by Mr. Rawbone in 1901, this bull has been his Stud Bull since. He was a prize winner in Scotland, has never been beaten here in Cape Colony, where he has won nine firsts, was Champion Bull this year at Rosebank, and leading Bull in the Group Class.

3.—"MILKMAN," Yearling Bull. *Sire*: "Osborne of Auchenbrach"; *Dam*: "Milkmaid." Won first prize this year at Stellenbosch, Rosebank and Port Elizabeth.

4.—"LOTTERY III," Cow under six years. *Sire*: "Coming King of Whitstonehill," A.H.B., vol. 16, 2685; *Dam*: "Lottery of Blackstone," A H.B., 8400. Lottery III has won six firsts, was champion cow at Rosebank 1905, and her sire was a great prize winner.

5.—"BLOSSOM II," Heifer under three years. *Sire*: "Dairyman of Nethercraig," A.H.B, vol. 24, 4420. *Dam*: "Blossom 6th of Munnoch," A.H.B., 8380. "Blossom II" has won five prizes in pens of heifers.

6.—"LOTTERY VI," Heifer under three years. *Sire*: "Osborne of Auchenbrach"; *Dam*: "Lottery II." Won first pen of three Port Elizabeth 1905, while her dam has won six prizes at different shows.

With the exception of "Osborne of Auchenbach" all the six in the photograph are Colonial-bred—in fact bred at Broadlands.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome.

Questions are also invited In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible

All letters or contributions should be plainly addressed: "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown;" they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication.

The So-called "Italian" Mealies.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I read with great interest in the July number of your Journal, the "Experiments with mealies as a forage crop," by Dr. E A. Nobbs.

What interested me especially, were the good results obtained with the so-called "Italian" mealies imported from Montevideo. As far as I could understand from the growing of this mealie, I think it is the same quality I imported myself for a small trial from my country near Venice, and tried it here in the Transvaal, with very good results. This quality of mealies is known by us in northern Italy under the name of "Cinquantino." "Cinquantino" means fifty, because this mealie ripens in about fifty days. In Italy we grow this quality of mealie as a second crop after the winter corn. It is sown in July or August, and is ripe in October or the commencement of November.

I tried it here with the idea of offering to the African farmer a mealie which could be sown and ripen in time, when the first mealies should have been destroyed by locusts or other casualties The farmer in that case had only to plough his fields afresh and sow this quick-growing variety. The crop of this "Cinquantino" is evidently smaller than that of the other, the seven months' mealies; also the plants and grain are smaller, but nevertheless it can very well substitute the better quality.

The "Cinquantino" is always one or more shillings lower in price, but I have no doubt that it would be a very great boon for many farmers if they could have this mealie to sow, when the other has been destroyed by a hailstroom. The Boers here in the Transvaal to whom I gave the few pounds I imported, were very satisfied with the results obtained.

Another plant which I would like to see introduced here in South Africa is the "Sola" we are growing in Central Italy. The "Sola" can very well replace lucerne in many parts of the country, as its culture is practically the same, but the sola is satisfied with less than the lucerne. Every agricultural station or school of Italy will be glad to send you a sample for testing purposes.

Returning to the "Cinquantino," I may say that we are growing it also for forage as described by Dr. Nobbs. When one piece of the veld is eaten up, the next is sown with this "Cinquantino," so that the cows have always fresh forage.

I am ready to give any other information, if desired by any of your readers.—Yours, &c.,

AUG. PRISTER.

P.O. Box 3,697, Johannesburg.

A mealie of the kind described is in urgent want in many portions of Cape Colony, and an order is being despatched for some seed for further experiment, as a result of the above welcome information. The "Sola" (in English, Sulla) is at present being tried by a number of farmers, from seed distributed by the Agricultural Department.—E. A. N.

Mr. S. B. Hollings on Lime and Sulphur.

To the Editor, AGRICULTURAL JOURNAL.

DEAR SIR,—By the last mail to hand, I have had sent a few cuttings from recent issues of the *Agricultural Journal* respecting the subject that heads this letter, and as the question of scab eradication interests me considerably, I would ask space to make a few remarks thereon.

It seems to me there are two distinct questions involved, (1) the effect of the dips in curing scab, (2) their influence upon the wool As to the former, your correspondents know a very great deal more than I do, and I will express no opinion.

As to the latter, there seems to be a great divergence of view, one section contending that lime and sulphur, the dip under controversy, is harmful to the wool, the other that it is harmless.

Now, presumably it is alike the desire and the interest of all parties to know the truth in this important matter, because if this remedy is really better than any other and does no damage to the wool, those who have hitherto opposed its use would be doing themselves an injury, while on the other hand, if it is harmful, those who are using it are doing so to their own detriment

The question of injury or otherwise is not a matter of opinion but of fact, and a fact which can be most readily verified

I have been engaged during the whole of my life in the purchase and manufacture of wool, and for many years have been retained as the professional wool adviser by most of the leading agricultural papers of the world. In the latter capacity very many questions have from time to time been submitted to me for investigation Prominent among these has been the influence of various dip ingredients upon the wool, and it has been my mission to ascertain the reasons why wools of certain countries, or parts of countries, have on account of their superiority become more popular than other wools from the same or different countries, and I am glad to say that I have more than once been able to put my finger upon the reason of the inferiority of the imperfect wools, and to bring about an improvement in the subsequent clips

If you ask any of the great firms at Bradford what is the most potent influence under the control of the sheepman, which affects for good or evil the qualities of the wool, one and all will tell you it is sheep dips, and one and all again will agree that the worst evil comes from the presence of lime in the fibre.

Wherever lime and sulphur is used as a sheep dip the reputation and value of the wool in that district suffers Sometimes the effect of the dip is apparent in the harsh texture, broken, uneven fibre, stunted growth and bad colour At other times these characteristics are less pronounced, and occasionally the harmfulness cannot be discovered from the appearance of the wool at all This is when the dip has been very carefully prepared from pure materials in the exact chemical proportions, and when the particles of objectionable matter which always exist in the best prepared lime and sulphur dip have been carefully eliminated This is the high-water point which can be attained in the use of this dip Even here, however, the wool may scour alright, it may bleach allright, but when it comes to the final or dyeing stage the cloven hoof asserts itself The effects of the dip have remained in the fibre and cannot be eliminated, and it is an absolute impossibility upon such wool to properly dye the fabric with several of the colours mostly in use by manufacturers But, unfortunately, this dip is not always scientifically prepared, and the materials from which it is made are not all correct, and then the evil is greatly exaggerated.

I have no hesitation whatever in stating that the use of lime and sulphur by the farmers of South Africa has not only lowered the general prices of South African wools but has inflicted a blow upon their reputation which it will take years to recover. Buyers will always give more for wools which they know will turn out well than they will for those which, even in a small percentage of cases, may turn out wrong. Whether the South African farmer derives in another direction benefits which counteract the loss in this, is a matter which they will naturally answer for themselves and upon which I desire to express no opinion. That is outside my province as a wool expert.

Lest it should be thought that these are interested opinions I may say that in my investigations of the subject I communicated with every leading wool dealer and manufacturer not only in England but throughout the whole of Europe. The replies I then received are now before me. There is not a single individual among them who expresses a single opinion which does not accord with the statement I am now making.

I have also before me a few of the many hundreds of samples of wool which I have from time to time tested. The lack of brightness in colour of even the best lime-and sulphur-dipped wools is very noticeable I enclose you two samples of wools of precisely the same character, grown within a few miles of one another upon sheep of equal quality, the one correctly dipped in lime and sulphur, the other in a preparation which is not injurious to the wool They were both scoured and dyed together You will see how differently they come out of the dyeing vat

Some time since I gathered up my investigations as to the damage done to wool by the various sheep dips into the form of a pamphlet. Before publication of this I submitted it to Mr. Walter Leach, the expert chemist of the Woolcombers' Association in Bradford, and with every word in that pamphlet he concurred. I am sending you, Mr. Editor, a few copies of this pamphlet in case any of your readers would like to see it

Let us, however, look at the matter through the eyes of the great High Priests of lime and sulphur, and scab eradication, viz., the Chief Inspectors of the Australian Colonies who carried through the scab eradication largely by the use of lime and sulphur, not made from imperfect materials and in a crude manner by the farmers as is so often done, but with all the materials manufactured by themselves with proper appliances, lime and sulphur, in fact, at i's best

Their reports are on record and are public property, and they do not burke this question of the wool. Here is what they say upon it.—

"Dipping is largely resorted to in this and the other Colonies for the destruction of lice, ticks, etc, in sheep, but in no instance is the lime and sulphur or tobacco and sulphur dip used for that purpose Both have fallen into complete disuse in all the Colonies on account of the damage they do to wool"

P R. Gordon, Brisbane, Queensland.

"Whilst lime and sulphur was used for the cure of scab, sheepowners found it effective for this purpose, but at the same time it was found that the wool was rendered harsh and dry on account of the lime"

G. Pentland, Melbourne, Victoria

"The use of lime and sulphur for sheep dipping deteriorates the quality of the wool upon which it is used."

J. M Craig, Perth, Western Australia.

"There can be no question that both lime and sulphur and tobacco and sulphur injure the wool"

Alex. Bruce, Sydney, New South Wales

I trust you will pardon the length of this letter and believe that my only object in intervening in the controversy is in the interests of the Bradford wool trade and the sheepowners in South Africa —Yours, etc,

S. B Hollings.

Calverley, near Leeds, June 8.

Lime and Sulphur *versus* Imported Dips.

To the Editor, Agricultural Journal.

Sir,—While so much has, and is, being written on the above subject, would you kindly allow me space to give my experience. I have been sheep farming for about 13 or 14 years, and up to about 6½ or 7 years ago used nothing but imported dips During all that time my sheep were never free from scab for any length of time, and it was quite a common occurrence to dip three and four times a year. although very careful about timing the dipping, and never letting a sheep out of the tank under two minutes, and in bad cases three and four minutes. I then made up my mind that I would get rid of scab, at any cost or trouble, and did not care whether it ruined my whole clip of wool or not. I took to lime and sulphur, in the following proportions. 18 lbs. lime and 25 lbs. sulphur to 100 gallons of water, and put sediment and all into the tank. I dipped my sheep twice in the above mixture in January, 1899. This was just 6½ years ago, and they have *never* had a touch of scab, or seen a dip since; except for a flock of weaned lambs, 14 months later, that got infected through a "trek" sleeping at the out-station with scabby sheep, during the war, while I was absent from the farm. As soon as scab was discovered among the lambs, they were also dipped twice in lime and sulphur, which stamped the disease out completely. Thus it will be seen that I did, on one occasion in three weeks and the other in two weeks, with lime and sulphur what I couldn't do in 7 years with imported dips. Now, with regard to its damaging the wool. My ewes, at the time of dipping, had six weeks' growth of wool, and the lambs 5 and 6 months' growth, and were shorn, the former with 12 months', and the latter with 15 months' growth. The whole clip was of excellent quality, and had not suffered in the least, and I got *full* market value, and have never had to dip since. Now, Mr. Editor, I will give you another little experience I had with one of my neighbours' sheep. He lives just over a mile from me, and was a constant source of danger after I had a clean bill, although continually dipping with imported dips. At length I made them the offer (their sheep were rotten with scab, and they had no tank) that if they gave their sheep one good dipping elsewhere for the first, in order to lessen the danger, I would undertake to supervise a second and third dipping, in my own tank, in lime and sulphur. This they agreed to do, and accordingly dipped the flock in some imported dip at another neighbour's. A fortnight afterwards I was asked to inspect the flock, and say whether I would take the risk of bringing the sheep on to my farm. To my horror the sheep were worse than before dipping, but I arranged that they should prepare the dip required the day before, and on the following morning drive as many sheep as my catch kraal would hold at a time, as fast as they could drive them from their farm to my dipping kraal. To save delay I cut my fence leading to the kraal, and the sheep were brought 300 odd at a time, in three lots, and dipped under my supervision. This was repeated a fortnight later, and from that date (over four years ago) to this those sheep have been absolutely free from scab

Needless to say, we are firm believers in lime and sulphur as a cure for scab This neighbour also sold his wool at full market rate, and thus, like myself, has no more use for a dipping tank, except he should buy a small lot of sheep or goats, which he never fails to dip, in a soap pot, before mixing with his flock, whether they have scab or not. To sheep farmers my advice is—dip in lime and sulphur twice, and remove your sheep to clean veld ; if that is not possible, to a clean sleeping place, and away with scab—when sheep farming becomes a pleasure and not a worry.

Before concluding, Mr Editor, I should like to draw attention to an error made by Mr. W. R Southey, of Varkens Kop, in his remarks concerning the number of prizes I took at the Grahamstown and Port Elizabeth Shows with my sheep and wool, which appeared in your issue of this month. He states I took 3 champions, 1 first, 4 seconds, and 3 thirds. The following is a correct list of prizes won by me at the two shows, viz., 3 champions, 10 firsts, 5 seconds, and 1 third. Thanking you in anticipation,—Yours, &c.,

FRED W. SOUTHEY.

Hillmoor, Steynsburg, July 10.

The Eradication of Scab.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I am glad to see my suggestions *re* How to compel malignant owners to clean their sheep, have drawn some criticism. It shows that some at least realise what might possibly happen if they persisted in keeping scabby sheep. I regret, however, that neither Mr. Gray nor Mr. Hunt have made other suggestions if they think mine too drastic

Mr. Gray says that the present Scab Act has been in force for the last seven years, which proves that the Act is not severe enough. In reply to Mr. Gray's questions : He must have misread my letter with regard to curing scab with one dipping in Cooper's. I only mentioned an instance where I dipped once, and that in a box in the ground. He will note that I stated that I hand-dressed the flock once a week, as regular as circumstances would permit, and that was done for about four months through the winter. I believe I had eradicated the scab by hand dressing, as I saw no signs of it when I dipped.

1. The supply of dips at cost If a man cannot ("will not," I should say) clean his flock in the two years, not to mention the years he has had it at cost, he would not do it in ten times that number, unless the Government did it for him, with funds out of the public revenue, or compelled him to do so by some drastic measure.

2. Every Inspector will tell me that all the scabby flocks are cleaned within the prescribed time in his area. That would not be the truth, or there would be no more scab. They may be passed through the dipping tank, but they are not always cleaned, as I have proved on certain occasions when I have bought sheep on a sale, by them breaking out soon after I got them home.

3. The remainder of the flock would not necessarily be clean, but could not be called scabby, if they shewed no sign of scab. They would remain with the owner, and he would take good care to have them clean before the Inspector came round again, for fear he might lose some more

Does Mr. Gray think that the Inspectors think more of their salaries than of cleaning their areas? If that is the case, sheep farmers should not assist them.

4 The Inspector would only visit the flocks under license, the clean farms he would visit on his ordinary round of inspection.

With regard to Mr. Hunt's letter. He thinks that I should have signed my name. I will do so in this instance if that will satisfy him.

He thinks it would be hard lines on a farmer to have to reduce his flock; so it would be if a severe measure was sprung on him all of a sudden, but if he got two years' notice and dip at cost, he would have only himself to blame if he still had scab, and was then compelled to reduce.

If he had, say, 1,000 sheep, he would have to sell the 700 or 800, and could do what he liked with the proceeds. There is nothing to prevent a man from dipping and putting them on a sale.

Of course, practical men would be needed. I think some of the present Inspectors are, and know the difference between scab and "steek gras." I don't exactly see what "steek gras" has to do with the eradication of scab, except that an inexperienced person might take one for the other, still I have not heard of a case where a man was fined for grass seed in sheep.

As to drought, I am of the opinion of Mr. A Warren, who says where there is enough water for sheep to drink, there should be sufficient to dip them.

In conclusion I may ask why should the Government spend thousands of pounds annually to keep a staff of Inspectors, etc , to control a disease which every farmer can cure within a few months (twelve months at the outside), if he would only make up his mind to do so

Why should the farmers who keep their flocks clean and the public in general contribute to the up-keep of the staff? Why should not those with infected flocks pay for the entire staff? Is it not for them that the Inspectors are appointed?

If Messrs Southey, A. Warren, E B. Cock, myself and hundreds of others can keep clean flocks, and would do so without Government assistance, why should not every farmer do the same?

All farmers, especially those with scabby sheep, will agree with me that we do not want the Inspectors, etc. Well, let us get rid of them by putting our shoulders to the wheel and getting rid of scab

Apologising for the length of my letter, and thanking you for the insertion — Yours, &c ,

D. B. MENNE

Middle Valley, East Griqualand, June 17

The Everlasting Scab Act.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I think it is my duty to the country to write on this subject, being one of the oldest farmers in this district. Having devoted all my life to farming, and having been one of the two scab inspectors first appointed in the district, I ought to know something about scab. So much has been written on this subject, and so many farmers think that the eradication of scab in the Colony will depend upon what dip is used. We all know that lime and sulphur, if properly prepared, will kill any scab, but that is just the difficulty. The ordinary farmer of the country does not prepare it properly, consequently he fails to cure his stock, and then says lime and sulphur is no good. There have been many kinds of dip especially prepared for the purpose of killing the scab insect, and my experience is that when used according to directions they will do so

When you have scab on sheep or goats, you have the insect in the palm of your hand, and by using any of the recognised dips you can kill him, and by dipping again in 14 days, and keeping the animals in the tank *two minutes*, they will be clean for ever. But now comes the rub. Some farmers take the dip that is over and sprinkle the kraal with it, and call the kraal disinfected. I can prove that you cannot disinfect a kraal except by *fire* and *fire only*. Dip your sheep and burn your kraal, and you will not see scab again. The proof of the pudding is in the eating of it. It is now between 15 and 16 years that the sheep in this place have been free from scab. I think that should be proof enough that scab can be eradicated. Cooper's Dip killed the scab, and the kraals were done away with and never used again. I made new ones. I do not believe in outside infection. In the late war small lots of sheep passed this place nearly every day. We even found scabby sheep mixed with ours, still they did not infect ours. The scab insect does not live in the veld—only in kraals and sheds. Kill them there, and you are safe. Be sure and not let strange sheep come into your kraals. For if they should be scabby, they will have time to scratch or bite the insect off on to the warm dung and infect your stock. The old maxim: Prevention is better than cure. I would advise that the above directions be carried out, and that the scab inspectors see that this is done. Fine the negligent farmer heavily (not two or three pounds), and double the fine every time. Let the Government do that, and scab will soon be a thing of the past. Of course jackal-proof fencing is the best way of keeping your stock clean, but it is not every farmer that can afford to put up such a fence, so it will not do to enforce that; but the poorer they are, the less sheep they will have to keep clean.

I know I am called an extreme man. But why should men who are anxious to keep their stock clean be infected by a negligent neighbour? I maintain, if the Scab Act is properly carried out, the Colony can be cleansed in three years. But inspectors must be independent men, that will not be afraid to do their duty, and the Magistrate must be ordered to support them. The half measures that are adopted now will never clear the country of the pest. Australia has done so, why can we not do it? The farmers make a hundred excuses, as I know. I say again take none, but enforce the Act.—Yours, &c.,

W. E. MURRAY.

Roodebloem, Graaff-Reinet, July 10, 1905.

Yet Another View.

To the Editor, AGRICULTURAL JOURNAL

SIR,—I, also like Mr. Cooke, have been reading with much interest the letters *re* Lime and Sulphur Dip in your issues. There is one point that most have forgotten, or, perhaps, they have never noticed, and that is the ready way in which this dip mixes with the wool-oil. It strikes down into the skin straight away. Then, again, a very important point is the watch! No farmer who has scab badly should dip without timing his sheep.

I was a beginner when scab appeared, and I fought for more than two years. I dipped in tobacco extract, which is very expensive. In Cooper's, which does not seem to have the oil-absorbing properties, and at its best should never be used on account of the risk. With lime and sulphur you are safe. Mr. Davidson advises that the lime and sulphur must be thoroughly mixed before putting into the pot. This is just extra work for nothing. Put into the pot straight away, and when it boils stir it well. To eradicate scab, dip in lime and sulphur. Time, so as to give each sheep one-and a-half minutes. Shift your kraal for at least three months. Dip the second time on either the thirteenth or fourteenth day after the first dipping Sooner, and some of the eggs have probably not hatched.—Yours, &c.,

J D.M.

Post Retief, June 27, 1905.

'Bars" in Ostrich Feathers.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—We, farmers, who keep ostriches, would feel very grateful if our able Veterinarians would make a study of the cause of "bars" in Ostrich Feathers. Most of us have at different times decided that we know the cause; but it has always been mere guess work. One farmer says the bars are caused by the Ostrich Fly, another will say the Ostrich Louse bites the young feathers at intervals, while it is pushing out. Yet another farmer says the bars are caused by the young feathers bending over and making a crease. Another will say bars are hereditary, and so on. The fact remains that to-day it is not known for certain how this great disfigurement originates. The annual output of this country is doubtless depreciated some thousands of pounds in value by these mysterious bars.

Now, Sir, were our able and energetic Vets. to make a special study of the growing feathers of half a dozen birds, I feel convinced they would soon not only find the cause, but tell us how to combat the evil.

Freedom from bars counts so many points at the inspection for getting an Ostrich on the Stud-book. If we knew *how*, I am sure we would have *full* marks there.

Hoping this matter will be taken up and thoroughly investigated.—Yours, &c.,

EWART J. COLLETT.

Dunblane, Middelburg, C.C , 10th July, 1905.

The whole subject is now under investigation, primarily by the Entomologist, as a mite is suspected. It will take some time to complete the enquiries now afoot, and if these are not satisfactory, further steps will probably be taken. It is, undoubtedly, a very serious loss to the industry.

Failure of Salt Bush Seed.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I obtained about a dozen pounds of Australian Salt Bush Seed from the Forest Department, Cape Town, which was sown at the best time of the year for these parts, and under the most favourable circumstances. Still not a single plant has come up. The ground was first ploughed, then sown, and harrowed with a light harrow, so that some of the seed would just be covered, and others about one or two inches deep. We had soft rains at the time, every few days for almost a fortnight. I also put in several kinds of garden seeds at the same time, which all came up well. Was it perhaps the wrong time of year, or what could have been the fault do you think?—Yours, &c.

J. W GREWAR.

Kleinpoort.

No explanation offers itself from the facts given. Salt Bush Seed sown as described should certainly have grown. It may be that the soil is not brak—that is not sufficiently alkaline. The mistake is often made of sowing Salt Bush on ordinary grain lands or veld to which it is not suited. Salt Bush requires "brak" ground—that is ground which is alkaline or salt on which little else will grow except perhaps "ganna" or other "brak-bosjes." Even if there is a white efflorescence on the surface of the ground or a moist black "brak" salt bush will grow. But it will not flourish in ordinary soil.—E A.N

Roof Water in Tanks.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I am using rain water from corrugated galvanized iron tanks for my household purposes. I find that during the summer and autumn when we get rain, and the water is constantly renewed, nothing could be better, but at this time of the year, when the water may have to stand for a month or more, it gets bad—not exactly stagnant, but a disagreeable smell and taste. Can you tell me of any simple plan for overcoming this?

We read recently of the discovery of the use of Bluestone for improving bad water. Would that act in this case, or would lime be beneficial?

I must apologise for troubling you with a subject hardly within the scope of an agricultural journal, but there must be a great many farmers to whom the matter is interesting. The water is caught on an ordinary galvanized iron roof, not painted or anything of the sort.

Thanking you in anticipation,—Yours, &c., "AQUA."

Lime is an excellent thing for tanks used as above. But the cause of this particular trouble will not be remedied by lime or anything else, but care and cleanliness. All tanks used for roof water should be cleaned out as often as possible and limed inside. In addition to this, all guttering and down-pipes leading from the roof should be also cleaned out at regular intervals, and, if possible, the connections so arranged that the early rain waters, after a spell of dry weather. are not allowed to run into the tank, There are several devices for this purpose. During the dry weather dust and vegetable matter gathers on roofs and in gutters, etc. The first storm washes all this into the tanks; it settles at the bottom, and is not noticeable for some time. But decomposition is bound to set in some time or another, hence the offending complained of.

Spring Hares.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I am much troubled with spring hares, and should be glad to hear of the best method of destroying them I have heard that carbon bi-sulphide being exploded in the holes is good, if you can recommend this method, I should be glad to know where I can obtain it, and also if it is safe in transport; also the correct method of exploding it. (2) Are McDougall's vermin chokers any good, and if so, where obtainable ?—Yours, &c.,

"TROUBLED."

There are several methods of tackling spring hares—viz traps, poisoned baits, &c Carbon bi-sulphide drives such vermin away by its fumes, as does the vermin choker In some cases they kill. But the best thing our correspondent can do is to enquire among his neighbours. The "old hands" generally have a good remedy for this sort of thing, suited to local conditions

India Rubber

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I shall be extremely pleased if you could give me any information in regard to the suitability of any portion of South Africa for producing India Rubber

As you are probably aware, the demand for rubber has increased at a greater pace than the supply, and the consequence has been, a gradual rise in the price of the raw rubber during the last 20 years

In some parts of the world, notably the American continent, it has been proved that rubber plantations are a good paying investment.

Can you give me any information as to

(1) Which part of South Africa (if any) is suitable for a plantation of rubber trees ?

(2) Which of the rubber producing trees is most suitable for this country ?

(3) Can the trees or seeds be got in this country ?

I enclose my card and beg to subscribe myself.

CAOUTCHOUC.

So far as we are aware no attempt has ever been made to cultivate any kind of Rubber Tree on a commercial scale in any part of the temperate portions of South Africa. (1) The only part likely to prove suited to such an experiment should be the northern portion of Rhodesia, for all the rubber trees that supply the commercial article in payable quantities are, particularly speaking, tropical varieties. (2) Which of the rubber producing trees is most suitable for this country, could only be decided by experiment. The rubber tree of Tropical Africa is the *Landolphia florida*. (3) We do not know of anyone who could supply rubber trees or seeds of same in this country. The Conservator of Forests might be able to give some information, the authorities at Delagoa Bay, or the Curator of the Botanic Gardens at Durban.

"The Farmer's Life."

To the Editor, Agricultural Journal.

Sir,—It has been my ambition for years to become a farmer, and I shall esteem it a favour if you will open your columns to a little correspondence as to whether a man, such as I, is likely to make a living in that path of life.

I am 35 years of age, strong and healthy, have always been fond of all sorts of out-of-door occupation, know a little about gardening, can use a pick and shovel, plant a tree, carry a bag of corn, ride a horse, drive a team of mules (six only), currycomb a horse and make his bed, dig a well, drain a marsh, build a house, kill a pig, set a hen, —and wring her neck, if necessary,—use a gun, sing a decent song, play a game of billiards, and take a glass of whisky *after work is over*.—Yours, &c.,

A Constant Reader.

Cape Town, June 9.

RURAL REPORTS.

For the month ending 15th July, 1905.

Bathurst.—Weather fairly mild. Veld not in over good condition. A rather heavy rain has fallen here during past month. Of fruits the citrus varieties and pines are good. Scale troublesome on citrus trees, Slaughter cattle are doing fairly well. Horses in fair condition and in good demand. Ostriches and pigs both in good condition.

Bedford.—We are having fine, bright, sunny days at present, with heavy frosts and dews at night. Veld growing splendidly where there are bushes. Grass not growing, owing to lateness of the rains. A good deal of oats has been sown. This is the dormant season for lucerne, but the lucerne lands have been thoroughly wet with the recent rains and this should result in early crops next spring. The rainfall for this month has been heavy, viz., 1½ inches, and far in excess of last season. Most cattle are out of the district in search of grazing, and what animals remain are in low condition on account of the drought. Sheep are in fair condition and lambing promises to be good. Goats are improving since recent rains, but still in low condition. Ostriches in good condition.

Carnarvon—We have had an average rain this month. The weather has been cold and frosty, foggy mornings and bright days predominating Veld is dry but plentiful. Wheat in fair general condition. There are no cattle in this ward. Horses in good condition and breeding well, prices falling slightly. Sheep in fair to bad condition Scab breaking out amongst flocks. Slaughter animals are almost unprocurable Goats breeding well Also suffering from scab.

Fort Beaufort—The district suffered very severely from drought during the past season, but fine rains have fallen during the last month or two and the prospect is decidedly much brighter. The farmers have been able to sow more than for several years. There is not much disease amongst stock at present.

Oudtshoorn.—Weather on the whole warm and mild, with occasional storms and frosts. A fair average rain has fallen in most parts and veld is doing well. No locusts have yet appeared. Mealie crops very good. Wheat, oats and other grain promise well. Oranges, naartjes and lemons are only fruits at present. Crops good and trees doing well where fumigated. Livestock of all description are in fair condition on the whole, especially small stock. Riding horses fetching £25 to £30, draught £30 to £40, mules £20 to £25. Markets firm. Ostriches are suffering considerably from cold weather in parts of the district.

Queenstown—Rainfall for the month above average. Weather very cold and windy during first half of the month, second half seasonable, frosty cold nights and bright days Karroo bushes growing well, but too early for grass yet. A great quantity of wheat has been sown since rains in May. Young cattle in very fair condition. Oxen and milch cows low. Horses, etc., in very fair condition Sheep in good condition, not many lambs yet.

Riversdale—Weather cold, though not exceptionally so for this time of year. Rains have been above the average, and season promises well. Veld in good condition for the winter. Ploughing is now nearly finished. Nearly double last year's quantity of wheat has been sown. Heavy crops of oats have also been put in. Only fruit at present is oranges, of which there is a good crop. Slaughter cattle scarce at present. Horses and mules in good condition for the time of year, and there are sufficient to meet the local demand. Sheep and goats are in very good condition, and free from scab. Ostriches are doing fairly well, and there is not much disease amongst them, with the exception of a few cases of tapeworm. Pigs doing well, though not plentiful.

Robertson.—The weather here is not cold for winter We have had no rain at all and the veld is in very bad condition for the time of year. Cattle are in good condition and free from disease Horses, mules and donkeys are all in very good condition. Prices have fallen somewhat. Cape goats on the whole doing well, as are also ostriches. Pigs in very fair condition in this ward

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Somerset East.—The rainfall for June was above the average, the local gauge registering 1·81 inches, but more than this quantity fell in the North Western portion of the District It is probable that more grain will be sown this season than for the last four or five years In ward No 5 alone upwards of 400 bags of grain, mostly oats, have been sown. The pasturage has improved, especially in the Karroo. Sheep are commencing to lamb and kidding is expected to be satisfactory. Ostriches which suffered severely from effects of drought are now fairly well. A few swarms of locusts have visited certain portions of the District doing damage in the outskirts of the town. An early spring may be expected Prospects are certainly encouraging on the whole.

TRANSKEI.

For the month ending 30th June, 1905.

Bizana.—The weather in the early part of the month was very boisterous. In fact on the first day of the month rain fell in torrents, being accompanied by a very strong wind, which was almost as violent as that which visited these parts in June, 1902. The extreme cold was responsible for the death of a good deal of stock. I estimate the losses at 500 head of large stock and quite 100 small stock. More rain fell subsequently, and in consequence, every one is looking forward to an early spring and a good season The crops are now being harvested, and from what one can gather the yield will be normal, though in parts of the district there will be a scarcity. The veld is good, and stock of all kinds in fair condition and free from disease.

Cofimvaba.—Good rains fell during June, freshening up the veld and improving the winter pasturage. There is every indication of an early spring All stock are in as good condition as can be expected at this time of year, and cattle and horses are free from disease of a serious nature.

Flagstaff.—The natives are all busy reaping their crops, and grain does not appear as scarce as first anticipated. At the present time mealies are realising 10s. a bag We have had a good deal of rain during the month, and the pasturage is good. Stock are doing well, and are free from disease.

Kentani.—Harvesting is still proceeding. Some of the mealie crops have suffered from the excessive rains that have prevailed, causing the grain to rot on the stalks The harvest is proving a poor one. Pasturage good and plentiful

Kokstad.—We are experiencing very changeab'e weather at present There was a very heavy snow fall on the 1st, accompanied by high wind. It was thought that heavy losses would be occasioned amongst stock, but most farmers escaped with the loss of a few sheep only. The pasturage is very poor, and there is scarcely a blade of grass to be seen owing to the severe frosts. Cattle, horses, and small stock are in fairly good condition. A case of Glanders was discovered during the month amongst horses introduced into the district from Pondoland.

Libode.—The weather during the month has been very cold, and there have been some severe frosts. Rain has fallen twice during the month. The veld has assumed its winter garb, although there is still plenty of nourishment in the grass. Everything seems to point to an early spring. In some parts of the district grain crop has been very fair, while in other parts nothing at all has been reaped. Horse-sickness disappeared with the first frosts. One case of Anthrax was reported, and the beast was destroyed No further outbreak has been reported. Stock of all kinds are in a healthy condition.

Lusikisiki.—Veld here is in fair condition. Weather cold. Only one rain has fallen so far. Mealie and Kaffir-corn crops are good. Cattle are in fair condition,, as are also mules and horses. Sheep, goats, and pigs in good condition.

Maclear.—A little rain fell in this district in the early part of the month, and that was followed by cold winds. The pasturage is very poor, but there is still sufficient nourishment to keep the cattle alive. Large as well as small stock are still in fairly good condition, considering the state of the pasturage. No outbreaks of disease amongst stock have been reported during the past month

Matatiele—High winds which prevailed early in the month dried up the veld considerably, but the beneficial effects of the heavy snow which fell on the 31st May, and had thoroughly saturated the ground, were not altogether lost. Cold weather was experienced, but towards the close of the month the temperature has gradually risen to mild. Stock are in the usual condition for this time of the year, and there is plenty of food and water for them for some months. Redwater has died out, and there is absolutely no contagious disease whatsoever amongst stock.

Mount Ayliff.—An exceptionally heavy rain has fallen this winter and veld is in excellent condition for this time of year. Weather mild with frequent showers Owing to the mildness of the season many fields of mealies and Kaffir corn have ripened which it was anticipated would be destroyed by frost The crops are better than was expected. Cattle are in good condition for time of year. A number of nice winter calves are making their appearance. Horses and mules are looking well owing to the good winter veld, the result of unseasonable warm winter rains. Sheep are in excellent condition. Slaughter animals as usual somewhat scarce. Goats beginning to feel the effect of winter.

Mount Frere.—Very heavy and cold rains fell on the 1st and 2nd of the month with heavy snow on the mountains The weather during the month has been extremely cold, and on the 22nd instant there was further rain The veld is in good condition for this season of the year and stock of all classes in good order though a bit pinched with the cold. There has been no fresh outbreak of disease during the month except one or two cases of Scab in Sheep. The Natives have only this month begun to harvest and the crops have been much damaged by winds and wet.

Nqamakwe.—Good rains fell at the beginning of last month, and also towards the end, but high cold winds and frosts have been prevalent so that the vegetation has a very wintry appearance. The state of the stock is normal.

Port St. John's.—We are having mild weather at present. Rainfall has been an average one and veld is now in good condition. Mealies and Kaffir corn are now being reaped Of fruit—oranges and naartjes are plentiful. Cattle are selling at fair prices owing to the demand created by labour agents paying labourers in cattle. There are scarcely any horses left here on account of horse-sickness. Ordinary Kaffir ponies are fetching upwards of £20.

Tabankulu—Good rains fell at the beginning and middle of last month, thoroughly soaking the country and doing a vast amount of good generally. The crops are being reaped, and the harvests are turning out fairly well. There is no disease amongst cattle and horses, which are in good condition, Sheep are thriving exceptionally well, and I am glad to say that owing to the efforts of the sheep inspectors scab is being well kept under.

Umtata.—There is little to state under this head. The weather has been exceptionally mild for this time of the year. Several warm showers of rain have fallen and there has been scarcely any frost. Pasturage is luxuriant and all stock are healthy and in splendid condition. Natives are busy reaping their crops, but it is generally believed that less than half the usual yield will be harvested.

Willowvale.—For this time in the year, all kinds of stock are in good condition. A few cases of Quarter-evil were reported during the month. The value of stock is slightly on the decrease. I have nothing further to report on my last month's return. Fruit, such as oranges and other winter fruit, is not nearly so plentiful as usual.

NOTES ON THE WEATHER OF JUNE, 1905.

By Charles M. Stewart, B.Sc., Secretary to the Meteorological Commission.

The weather of June was remarkable for unusually low pressure, exceptionally low temperatures, practically daily, severe frosts, high percentage of cloud, with frequent local fogs, abnormally heavy rainfall, hail, sleet, and snow, a few local thunderstorms and strong northwesterly winds, with some heavy gales.

Precipitation.—The average precipitation during last month, based on the returns from 315 rain guages, was 3·02 inches, falling on six days, being 1·52 ins., or 101 per cent above the average. That this excessive precipitation was fairly general is shewn by the subjoined table. From this it will be seen that a deficiency of rainfall was limited to the Northern Border, Basutoland, Orange River Colony, while there was an entire absence of rainfall at the stations in Bechuanaland and Rhodesia. The North-East and Kaffraria had practically the average amounts, but elsewhere the rainfall was from one-and-a-half to about three times the normal, the excess being greatest in the West (*i. e.* over the Cape Peninsula, the South-West, and the West Coast Divisions) and over the East Central Karoo. An examination of the Royal Observatory records from April, 1841, shows that last month's total of 13·29 ins. on 19 days has been exceeded on only one occasion, viz., May of 1877, when 13·46 ins. was recorded. A considerable amount of damage was done to roads and houses by these heavy rains in the Peninsula. The extraordinary total of 11·12 ins. at Durban on four days appears to have been unprecedented by any previous June, although this amount was exceeded by September, 1893, with 13·84 ins., October, 1893, with 13·65 ins., and December, 1895, when 11·23 ins. fell. That the precipitation was practically general over the country is shewn by the fact that of the 315 stations, only 13 reported "Nil"; of the remainder, 113 had one inch or less; 85 had between 1 and 2 ins., and 36 had between 2 and 3 inches

Division.	Mean Rainfall (1905).	Mean No of Days.	Average Rainfall. (1894-1903)	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Ins.		Ins.		Ins.	Percent.
Cape Peninsula ..	16·79	19	5·71	13	+ 11·08	+ 194
South-West ..	6 29	14	3·09	7	,, 3 20	,, 104
West Coast ..	2·62	13	1·14	5	,, 1·48	,, 130
South Coast ..	2·16	6	1·83	5	,, 0·33	,, 18
Southern Karroo ..	1·29	4	·70	3	,, 0·59	,, 84
West Central Karroo ..	·62	3	41	2	,, 0·21	,, 51
East Central Karroo ..	1·08	3	·40	2	,, 0·68	,, 170
Northern Karroo ..	·76	4	·41	2	,, 0 35	,, 85
Northern Border ..	·12	1	·28	1	— 0·16	57
South-East ..	1·87	6	1·19	3	+ 0 68	+ 57
North-East ..	·66	4	·67	2	— 0·01	— 1
Kaffraria	1·08	4	1·10	2	,, 0·02	,, 2
Basutoland ..	·35	2	·98	2	,, 0·63	,, 64
Orange River Colony ..	·02	1	·70	2	,, 0·68	,, 97
Durban (Natal) ..	11·12	4	94	..	+ 10·18	+ 1083
Bechuanaland ..	·00	0	·22	1	— 0·22	— 100
Rhodesia	·00	0	·14	1	,, 0·14	,, 100

Quantities exceeding three (3) inches were confined to the Cape Peninsula, South-West, West Coast, South Coast, the South-East, and Natal; totals of over 6 inches occurred over the first two and the last divisions, while amounts exceeding 13 inches were entirely confined to the Cape Peninsula. Thirteen stations had 3—5 inches, 17 stations had 5—10 ins.; 20 from 10—20 ins., and 7 between 20 and 30 inches. The maximum amount recorded was 30·36 ins. at Waai Kopje on Table Mountain. An analysis of the maximum daily falls shews that (excluding the 13 stations with "No Rain") 211 stations out of 296 had 1 inch or less; 60 had 1—2 ins.; and 18 had between 2 and 3 inches; the remaining seven with maxima exceeding 3 inches in 24 hours were:—Buffel's Nek, 3·01 ins. on 24th; Woodstock (Quarry) 3·20 ins. on the 14th; Newlands (Montebello), 3·26 ins. on the 8th; Groot Constantia, 3·75 ins. on the 5th; Kenilworth, 3·78 ins. on the 5th; Bishopscourt, 5·32 ins. on the 5th, while the heaviest of all was 10·70 ins at Durban on the 1st, which is said to have fallen in 15 hours

This last amount occurred during a Southerly to South-West gale, which started on the afternoon of the 31st May, and died out on the afternoon of the 2nd. This heavy precipitation was apparently fairly general over Natal, causing the dam of the Pinetown reservoir to burst, with the result that many lives were lost. Snow fell at the more elevated stations, such as Glencoe, where it was stated to be 9 ft. deep in drifts; precipitation also assumed this form at Bethlehem, Barkly East, Kokstad, and elsewhere, but was most severe in Natal, trains being blocked in the neighbourhood of Maritzburg. *Thunderstorms* occurred on 13 days at 42 stations chiefly on the 22nd and 23rd. *Hail* fell at 19 stations on 7 days, principally on the 11th. *Snow* was reported from altogether 39 places on 11 days of the month, but was most widely distributed on the 11th and 1st. *Sleet* occurred at 24 stations on 14 days, being most commonly reported on the 11th.

Temperature, Cloud and Wind.—One of the most striking features of the weather of June was the exceptionally low mean temperatures. The mean of all the stations was only 51·5° or 2·2° less than the average. This unusual cold was mostly due to an absence of warmth during the day, the mean maximum for last month (61·1°) being 5·2° lower than the normal, while the mean minimum of 41·9° is 0·8° higher than the average. A comparison of the mean temperatures of the individual stations shews that the deficit was practically general all over the country, the only exceptions being Ceres, Mohalie's Hoek, and Hope Fountain, which were about 1° warmer than usual. The deficiency in mean monthly temperature varied from—7° at O'okiep to—0·9° at the Royal Observatory. Generally speaking, mean temperature was below the average by from 1 to 2 degrees in the Cape Peninsula, the South-West, and South Coast, and by about 3—5 degrees at stations within about 30 miles from the coast, but decreasing to 1 and 2 degrees in the central portions, *e g.*, Aliwal North, Kimberley, &c., the deficit becoming converted into an excess of 1·6° at Hope Fountain in Rhodesia. The mean maxima were so far below the average as to be almost incredible, being—8·2° at O'okiep,—8·4° at Bedford,—7·5° at Stutterheim,—7·0° at King William's Town, but most generally about *minus* 4 degrees. The night temperatures (*i e.*, minima) varied between an excess of *plus* 6·4° at Mohalie's Hoek in Basutoland and a deficit of *minus* 5·9° at Sydney's Hope. The mean daily range of 19·2° was 6·0° less than the average. The month of June last was 5·3° colder than May. The mean warmest station was Hope Fountain with 60·2°, the mean coldest, Moyeni (Basutoland), with 42·5°, a difference of 17·7°. The highest mean maximum of 76·0° belongs to Hope Fountain, while the lowest mean minimum of 30·1° is found at Teyateyaneng in Basutoland.

The warmest days of the month were mostly from 1st to 4th, although in some cases the maximum for the month was registered on the 29th and 30th. The coldest mornings were most generally from 12th to 14th and the 20th. The mean of the absolute maxima was 71·2° (10·3° less than in May), while the absolute minima averaged 34·2°, or 3·6° lower than the previous month, giving a mean monthly range of 37°. The highest temperature of 81·8° occurred at Hope Fountain, on the 8th and 9th, while the lowest for the month was 20·0°, registered at Aliwal North on the 13th, and at Teyateyaneng on the 14th. There was, therefore, an extreme range of only 61·8° throughout the month, over all the stations. *Frosts*, mostly very severe, were noted at altogether 205 stations, and on every day of the month, except the 23rd; they were most commonly reported on the 8th, 19th, 20th and 26th.

The markedly low day-temperatures were coincident with a high percentage of *Cloud* (45 per cent.) at 8 a.m., being 11 per cent more than usual. Contrary to what usually obtains during this month, the distribution of cloud was fairly uniform over the Colony, being mostly about 60 per cent. along the coasts, and about 40 per cent. in the interior, Kenhardt having as much as 21 per cent. The amount of sky obscured varied from 71 per cent. at Disa Head to 2 per cent. at Hope Fountain. *Fogs* or *Mists*, mostly local, occurred at 93 stations on altogether 29 days, the only two dates on which this phenomenon was not reported being the 12th and 19th; they were most numerously reported between the 22nd and 24th.

The prevailing winds in the morning were Westerly to North-Westerly all over the country, except at Kimberley, where they were North-Easterly, and Hope Fountain, where they were South-Westerly. These winds were exceptionally strong for this month, having an average force on the Beaufort Scale of 2·29 corresponding to a velocity of 14·45 miles per hour. The wind attained the force of a gale on seven days of the month, especially on the 1st, 4th and 22nd No instance of hot winds were reported during the month.

OBSERVERS' NOTES—JUNE, 1905.

Groot Drakenstein.—Temperature, mean 2° below average for six years. Absolute maximum, lowest ever recorded; also mean daily range. Mean minimum, 0·4° below average Rainfall, 3 17 inches above average for ten years. Rain fell on 16 consecutive days (3rd—18th), but not heavy enough to do damage. Thunderstorms or thunder on five days—an unusual feature

Potberg.—Frequent rains have done an immense amount of good to young crops, and ploughing has gone on continuously.

Kokstad (The Willows) —The blizzard which commenced on the night of the 31st May died out on the afternoon of the 2nd June. Apparently we experienced merely a portion Natal suffered severely with snow, wind and rain, damage resulting to buildings and heavy loss of life. In Kokstad a few head of cattle died from exposure on the slopes of Mount Currie, and three natives lost their lives. The snow still lies on Mount Currie and Ingeli. The month has been marked by high winds and severe frosts. On the 23rd and 24th we had quite a warm rain. Such rains at this period of the year are most unusual. We anticipate an early spring. Stock looks well.

Kenilworth —Rainfall for month, 23·07 in. The heaviest monthly fall at this station during a record of 16½ years.

Vruchtbaar —The excessive rainfall has very much hampered farm work.

Concordia (Krapohl).—At 7.55 p.m. on the 27th a rumbling noise was heard, due to supposed earthquake.

Tankatara.—A very cold month; white frosts frequent in mornings.

Boschfontein.—Greater part of the month was characterized by cloudy weather with bitterly cold N W. winds. Hard frosts occurred every day except 17th, 18th, 23rd and 24th. Flying locusts fairly numerous not travelling but most of the time huddled together under bushes, worried by large numbers of spreeuws, jackals also feeding on them

Alexandria —Crops very young No prevalent diseases

Dagga Boer.—Heavy showers, strong N.E. wind, warm rain. Dams all full. Drought seems fairly at an end now.

Thomas River.—Cold rains, but doing a vast amount of good.

Thibet Park —Best rain in June, since I have kept the record here. Rainfall for month 1·94 in on 6 days.

Carnarvon Farm —This month is all but a record for wind and general misery; we have had thirteen cold windy days and several 10° and 12° frosts. Frosts more or less severe, occurred on seventeen nights. This is the first time for fourteen years that we have not had one cloudless day.

Kokstad.—Strong, cold winds prevailed during the month. Snow, that fell at end of May, still lying on mountains.

Zwartlaagte.—Cold weather, heavy frosts. Cold S. winds from beginning to about middle of month. Latterly wind changed round to N. Weather mild during latter period.

Fort Rixon.—Slight white frost in early morning throughout the month, with warm days. Winds from all directions except our usual Easterly one.

TEMPERATURE, JUNE, 1905.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory ..	60·8	48·3	54·6	70·8	2	38·5	1
Cape Town (Fire Station) ..	60·8	50·5	55·6	69·0	3 & 4	46·0	14
,, ,, (S.A.C.) ..	61·6	47·0	54·3	71·0	2	41·0	25
Sea Point	61·5	50·2	55·8	71·0	3	44·0	1
Simon's Town	63·0	51·4	57·2	72·0	1	46·2	14
Groot Constantia ..	60·3	48·0	54·2	69·0	1	42·0	12
Blaauwberg	61·1	48·5	54·8	71·0	2	42·0	21
Wynberg	61·4	47·0	54·2	70·5	2	41·2	2
Groot Drakenstein ..	60·0	44·9	52·4	70·0	2	37·4	14
Wellington	62·3	45·5	53·9	70·0	5	38·0	14
Elsenburg (Agri. College) ..	59·4	44·1	51·8	67·6	29	36·6	20
Robertson Govt. Plantation	63·0	41·3	52·2	73·0	3	31·0	13
O'okiep	54·9	39·1	47·0	66·8	21	32·9	12
Ceres	59·9	39·2	49·5	70·0	4	28·0	2
Cape L'Agulhas ..	60·5	51·4	55·9	68·0	2	45·0	7
Storms River	62·4	44·0	53·2	72·0	26	36·0	26
Concordia (Plantation) ..	60·5	47·4	53·9	75·0	4	43·0	8 & 13
Cape St. Francis ..	63·6	48·0	55·8	79·0	4	41·0	21
George (Plantation) ..	62·3	45·8	54·0	74·8	3	39·0	20 & 21
Port Elizabeth ..	64·8	49·7	57·3	77·0	4	42·0	26
Heidelberg	61·3	39·0	50·1	70·0	3 & 26	31·0	14
Rust en Vrede	57·3	37·5	47·4	67·0	4	30·0	20, 21, & 29
Amalienstein	61·5	35·6	48·6	71·0	3	28·0	13 & 14
Murraysburg	55·8	32·8	44·3	65·0	23	26·0	30
Kimberley	63·8	33·7	48·8	78·2	22	24·9	12
Bedford	59·6	39·2	49·4	71·0	5	30·0	20
East London	67·1	48·6	57·8	79·0	5	42·0	20
Grahamstown	60·9	39·7	50·3	76·0	4	32·2	20 & 26
Evelyn Valley	55·9	40·5	48·2	67·0	4 & 29	34·0	20
Sydney's Hope	60·3	42·2	51·2	72·0	4	33·0	26
Stutterheim	58·9	42·3	50·6	69·5	4	34·0	26
King William's Town ..	64·5	41·3	52·9	72·0	22	32·0	19 & 25
Aliwal North	59·1	31·5	45·3	70·0	29	20·0	13
Rietfontein (Aliwal North)..	53·8	31·4	42·6	65·0	29	21·0	13
Kokstad (The Willows) ..	61·9	34·0	47·9	72·0	27 & 30	24·0	13
Mount Ayliff	64·8	40·6	52·7	79·0	6	32·5	12
Matatiele	60·4	35·5	48·0	70·0	29	27·0	13
Port St. John's	68·1	51·1	59·6	72·0	7, 12, & 23	42·0	11
Main	59·2	41·6	50·4	70·9	4	32·5	20
Umtata	64·5	37·8	51·2	77·0	4	28·0	26
Moyeni	54·7	30·2	42·5	67·0	6	21·0	12
Teyateyaneng	58·9	30·1	44·5	67·0	30	20·0	14
Mohalie's Hoek ..	56·0	32·7	44·4	65·0	7 & 30	22·0	13
Hope Fountain ..	76·0	44·4	60·2	81·8	8 & 9	37·0	1 & 2
Means	61·1	41·9	51·5	71·2	..	34·2	..
Extremes	..	..	..	81·8	8 & 9	20·0	13 & 14

RAINFALL, JUNE, 1905.

I. CAPE PENINSULA:

	INCHES
Royal Observatory, (*a*) 12 inch gauge	13·29
Cape Town, Fire Station	13·27
Do South African College	15·66
Do Sea Point (Hall)	12·19
Do do. (Attridge)	12·61
Do Molteno Reservoir	16·20
Do Platteklip	19·48
Do Signal Hill	11·57
Table Mountain, Disa Head	13·03
Do Kasteel's Poort	22·91
Do Waai Kopje	30·36
Do St. Michael's	27·60
Newlands (Montebello)	28·20
Bishopscourt	27·13
Kenilworth	23·07
Wynberg (St. Mary's)	23·83
Groot Constantia	20·60
Simon's Town (Wood)	13·41
Do. (Gaol)	14·26
Blaauwberg Strand	6·92
Robben Island	7·51
Camp's Bay	12·82
Fish Hoek	12·25
Cape Point	6·25
Woodstock (The Hall)	13·35
Do (Quarry)	18·80

II SOUTH-WEST:

Eerste River	9 71
Klapmuts	8·72
Stellenbosch (Gaol)	9·46
Paarl	12·31
Wellington (Gaol)	7 80
Do (Huguenot Seminary)	6·98
Groot Drakenstein	9·02
Tulbagh	3·05
Kluitjes Kraal	5·53
Ceres	10 86
Caledon	5 04
Worcester (Gaol)	3·06
Hex River	3·60
Lady Grey (Div. Robertson)	0 85
Robertson	0·96
Robertson (Govt. Plantation)	1·01
Montagu	1·90
Porterville Road	4·97
Rawsonville	8·08
The Oaks	5 00
Danger Point	11·41
Vijgeboom's River	10·06
Elsenburg Agricultural College	8·14
Roskeen	5·21
Vruchtbaar	8·30

III. WEST COAST:

Klipfontein	1·35

III. WEST COAST—*Continued*

	INCH
Kraaifontein	1·1
O'okiep	1·1
Garies	0·2
Kersefontein	4·1
The Towers	4·1
Dassen Island	4·1
Malmesbury	5·5
Piquetberg	4·7
Van Rhynsdorp	1·9
Clanwilliam (Gaol)	2·4
Anenous	1·4
Zoutpan	3·2
Wupperthal	3·6
Concordia (Krapohl)	1·0

IV. SOUTH COAST:

Cape L'Agulhas	3·4
Bredasdorp	2·2
Swellendam	2·9
Heidelberg	1·3
Riversdale	1·6
Geelbek's Vlei	0·9
Mossel Bay	0·8
George	2·2
Millwood	3·0
Sour Flats	1·9
Concordia	1·8
Knysna	1·4
Buffels Nek	5·1
Harkerville	2·8
Plettenberg Bay	2·67
Blaauwkrantz	4·76
Storm's River	8·47
Cape St. Francis	2·60
Witteklip	2·64
Uitenhage	1·58
Do (Park)	1·56
Port Elizabeth (Harbour)	1·21
Tankatara	0·76
Lottering	4·24
Shark's River (Nursery)	1·79
Do (Convict Station)	2·00
Karnmelk's River	2·52
Zuurbraak	3·00
Vogelvlei	1·24
Great Brak River	0·79
Kruis River	1·92
Armadale	0·47
Centlivres	0·82
Woodifield	1·80
Potberg	2·53

V. SOUTHERN KARROO:

Ladismith	1·75
Amalienstein	1·54
Calitzdorp	0·55

V. S. KARROO—*Continued*

	INCHES
Oudtshoorn	0·50
Uniondale	1·63
Kleinpoort	0·80
Rust en Vrede	2·26

VI. WEST CENTRAL KARROO:

Prince Albert Road	0·05
Prince Albert	0·85
Zwartberg Pass	2·60
Beaufort West	0·08
Camfer's Kraal	0·02
Baaken's Rug	0·10
Willowmore	1·05
Steytlerville	0·82
Krom River	0·03

VII. EAST CENTRAL KARROO:

Aberdeen (Gaol)	0·37
Aberdeen Road	0·45
Kendrew	0·34
Graaff-Reinet	0·72
New Bethesda	1·02
Roode Bloem	0·81
Buffelskloof	1·83
Glen Harry	1·95
Bloemhof	1·55
Jansenville	0·50
Toegedacht	0·72
Klipfontein	1·08
Cranemere	1·69
Somerset East	1·81
Middelwater	0·92
Roode Hoogte	0·88
Walsingham	1·04
Arundale	2·36
Spitzkop	1·13

VIII. NORTHERN KARROO:

Sutherland	1·46
Fraserburg	0·16
Carnarvon	0·08
Brakfontein	0·12
Victoria West	0·22
Britstown	0·41
Murraysburg	1·03
De Kruis	2·37
Richmond	1·25
Philip's Town	0·07
Boschfontein	0·15
Petrusville	0·18
The Willows	0·23
Naauwpoort	0·96
Middelburg	0·54
Colesberg	0·15
Cradock	0·76
Do (D.E's)	0·74
Witmoss	1·71
Steynsburg	0·67
Quagga's Kerk	2·57
Tarkastad	1·33
Riet Vlei	1·38
Varken's Kop	0·41
Hillmoor	0·56
Glen Roy	1·91

VIII. N KARROO—*Continued*

	INCHES
Waverley	0·51
Wildebeestkooij	0·14
Maraisburg	0·70
Montagu	0·34
Rietfontein (Cradock)	1·68
Schuilhoek	0·38

IX. NORTHERN BORDER:

Kenhardt	0·41
Van Wyk's Vlei	0·26
Prieska	0·05
Dunmurry	0·15
Griqua Town	0·06
Douglas	0·31
Newlands (Div. **Barkly West**)	0·00
Kimberley (Gaol)	0·00
Do. (**Stephens**)	0·02
Upington	0·00
Trooilapspan	0·00
Karree Kloof	0·13

X. SOUTH-EAST:

Melrose	1·16
Cheviot Fells (Bedford)	2·20
Bedford (Gaol)	1·03
Do (Hall)	1·03
Sydney's Hope	1·64
Adelaide	0·51
Atherstone	1·84
Alexandria	3·62
Salem	2·20
Graham's Town (Gaol)	1·75
Do. (Bact.Inst.)	1·92
Heatherton Towers (near **Graham's Town**)	1·05
Fort Beaufort	0·73
Katberg	1·94
Balfour	1·56
Seymour	1·23
Glencairn	3·57
Port Alfred	3·61
Hogsback	2·40
Thaba N'doda	2·68
Peddie	1·63
Cathcart	0·82
Keiskama Hoek	2·24
Thomas River	1·00
King William's Town	1·42
Stutterheim (Besté)	0·58
Dohne	1·41
Blackwoods	1·19
Albertvale	0·74
Lynedoch	1·99
Kubusie	0·45
Blaney	1·35
Kei Road	2·45
Evelyn Valley	4·74
Berlin	2·37
Isidenge	3·11
Perie Forest	1·48
Quacu Forest	0·74
Kologha	1·28
Fort Jackson	2·15
Komgha	2·35
Prospect Farm (Div. Komgha)	1·78

X. SOUTH-EAST—*Continued*

	INCHES
East London, West	3·86
Do East	2·86
Fountain Head	1·39
Bolo	1·08
Fort Fordyce	1·17
Daggaboer	2·17
Sunnyside	1·79
Forestbourne	2·41
Chiselhurst	2·59
Cata	1·59
Wolf Ridge	2·39
Dontsah	2·16
Mount Coke	3·20

XI. NORTH-EAST:

Venterstad	0·42
Ellesmere	0·23
Burgersdorp	0·20
Molteno Station	0·60
Thibet Park	1·94
Sterkstroom	0·35
Rocklands	0·57
Aliwal North (Gaol)	0·36
Do. (Brown)	0·41
Rietfontein	0·52
Hex's Plantation	1·58
Carnarvon Farm	0·56
Queenstown (Gaol)	0·51
Herschel	0·97
Lady Grey	1·38
Bolotwa, Contest	0·48
Lady Frere	0·33
Keilands	0·71
Barkly East	1·06
Mooifontein	0·37
Poplar Grove	0·52
Whittlesea	0·77
Halseton	0·74
Blikana	0·63
Table Hill	1·04
Hughenden	0·15
Glen Wallace	0·61

XII. KAFFRARIA:

Slaate, Xalanga	1·16
Ida, Xalanga	0·88
Kokstad (The Willows)	0·40
Cedarville	0·17
Cofimvaba	1·73
Nqamakwe	2·43
Main	1·06
Engcobo	1·12

XII. KAFFRARIA—*Continued*

	INCHES
Butterworth	1·88
Kentani	2·31
Maclear	0·15
Idutywa	0·00
Willowvale	1·62
Mount Fletcher	0·66
Elliotdale	0·75
Mqanduli	1·10
Matatiele	0·11
Umtata	0·86
Kokstad	0·41
Port St. John's	2·10
Umzimkulu	0·23
Tabankulu	1·09
Somerville (Div. Tsolo)	0·45
Tsomo	1·24
Bazeya	0·95
Cwebe	2·28
Mount Ayliff	0·67
Seteba	0·06
Flagstaff	1·70
Insikeni	0·11
Mandileni	3·00
Xalanga	1·94

XIII. BASUTOLAND:

Mafeteng	0·30
Mohalie's Hoek	0·61
Qacha's Nek	0·00
Moyeni Quthing	0·96
Teyateyaneng	0·32
Leribe	0·06
Maseru	0·20

XIV. ORANGE RIVER COLONY:

Imperani	0·02

XV. NATAL

Durban, Observatory	11·12

XVII. BECHUANALAND:

Vryburg	0·00
Taungs	0·00
Setlagoli	0·00
Zwartlaagte	0·00

XVIII. RHODESIA:

Hope Fountain	0·00
Matopo Park	0·00
Fort Rixon	0·00

DEPARTMENTAL NOTICES.

Introduction of Live-stock—including Swine—into the Transvaal Colony.

The following conditions regulating the introduction of Live-stock—including Swine—into the Transvaal Colony, as recently imposed by that Government, are published for general information.—

D. Hutcheon,
Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon,
Cape Town, 10th July, 1905.

No. 6.

No. 1.—Cattle.

No cattle will be admitted into the Transvaal by road or rail unless the owner has previously applied and obtained a written permit from the Department of Agriculture, Pretoria. This permit must be presented to the Stock Inspector along with the animals at the Ports of Entry specified in the permit.

In making application for this permit the following particulars must be furnished: Name of owners, locality from which the cattle come, purpose for which they are being introduced, number of animals to be introduced (if coming by rail, station at which they are to be trucked, station at which they are to be derailed) name of consignee and ultimate destination of the animals. These particulars are required for the information of the Advisory Committee of the Ward or District into which the cattle are to be introduced, by whom all permits have to be recommended before they are issued

Slaughter Cattle will be branded at the Port of Entry with the brand $\overset{S}{\underset{\Lambda}{-}}$ *on the left side of the neck before proceeding to their destination, if this has not been already done by the consignor before shipment*

No. 2—Equines.

All persons introducing equines into the Transvaal must produce certificates for their animals signed by a qualified Veterinary Surgeon holding the Diploma of the Royal College of Veterinary Surgeons, England, stating that the animals are free from disease, and that they have been tested with mallein, and all have reacted in a normal manner. These certificates will be collected by the Stock Inspector at the Port of Entry. If any horse is presented for admission without a certificate, it will either be tested with mallein by the Stock Inspector, and allowed to enter after the Inspector is satisfied that the animal is free from disease, or it may be allowed to proceed to its destination and tested there, whichever course is most convenient for the Department.

Exceptions.

Equines which are engaged in to and fro movements across the border. Equines which have recently come from the Transvaal and are returning thither.

Racehorses in training will be allowed to proceed to their destination upon the owner giving an undertaking to report their arrival to the Government Veterinary Surgeon of the District, and to submit the imported animals to the mallein test if the Government Veterinary Surgeon considers this necessary. All other equines will be detained and tested unless the owner has previously made other arrangements with this Department.

No. 3.—SHEEP.

Sheep are subject to examination at the Port of Entry, and liable to detention if ound affected with Scab.

No. 4.—PIGS.

Pigs from Cape Colony are now allowed to enter the Transvaal if the following conditions are observed —The person desiring to introduce swine into this Colony from Cape Colony shall make application to the Director of Agriculture, Pretoria, stating the place from which and the person from whom the swine are being obtained, and giving particulars as to their number, destination, and the purpose for which they are being introduced; he shall further submit with such application a certificate signed by the Chairman of local authority of the District from which the animals are to be brought and endorsed by the Chief Veterinary Surgeon or his representative, to the effect that such swine are free from swine fever, and that there has been no swine fever in the place from which they have been immediately obtained

Upon receipt of such documents the Director of Agriculture may grant and transmit a permit authorising the introduction of such swine. Such permit shall be sent with the animals, and shall be handed over to the Stock Inspector at the Port of Entry

Permits for the introduction of pigs from other Colonies are not required.

C. E GRAY,
Principal Veterinary Surgeon.

Department of Agriculture, Pretoria.

The Introduction of Swine into the Orange River Colony.

The following conditions regulating the introduction of swine into the Orange River Colony as recently modified by the Government, are published for general information

D. HUTCHEON,
Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon,
Cape Town, 10th July, 1905.

No. 7.

PROCLAMATION No. 57 OF 1905.

Whereas it is desirable to remove certain restrictions imposed upon the importation of swine from the Cape Colony by Proclamation No. 11 of 1904

Now, therefore, under and by virtue of the powers in me vested by the Animal Diseases Ordinance No. 13 of 1903, I do hereby proclaim, declare and make known as follows:—

1. Proclamation No 11 of 1904 is hereby repealed

2. From and after the date of this Proclamation it shall not be lawful to introduce or import swine into this Colony from the Cape Colony except under the following conditions.—

(a) The importer of such swine shall at the place of entry into this Colony produce a certificate signed by the Chief Veterinary Surgeon of the Cape Colony or his representative at Cape Town, that such swine are free from disease and that the area in the Cape Colony from which they have been conveyed is not infected with Swine Fever.

(b) The importer of such swine shall before importation apply to the head of the Veterinary Department of this Colony at Bloemfontein for permission to import and shall state in his application from whom and from what place such swine were obtained, their number, description and destination.

3. Any person contravening the provisions of this Proclamation shall be liable to a fine not exceeding one hundred pounds, or in default to imprisonment with or without hard labour for a period not exceeding twelve months.

4. Any swine introduced or imported into this Colony in contravention of this Proclamation shall be confiscated and destroyed.

GOD SAVE THE KING!

Given under my hand and seal, at Bloemfontein, this 5th day of July, 1905.

H. GOOLD-ADAMS,
Lieutenant-Governor.

By command of His Excellency the Lieutenant-Governor.

B. T. BLACKWOOD,
Acting Colonial Secretary.

Ports of Entry into Orange River Colony.

The subjoined corrected list of Ports of Entry for Live Stock from the Cape Colony into the Orange River Colony, together with the conditions imposed by that Colony, is hereby published for general information, and will replace my notice of the 26th ultimo

D. HUTCHEON,
Chief Veterinary Surgeon.

Office of the
Chief Veterinary Surgeon,
Cape Town, 13th July, 1905.

No. 8.

Ports of Entry for Live Stock.

1. Frere Road Bridge
2. Bethulie Road and Railway Bridges.
3. Norval's Pont Railway Bridge.
4. Colesberg Road Bridge.
5. Dalton's Pont on the farm Welgedraai, Division of Fauresmith.
6. The farms Ramah and } in the Division of Jacobsdal
7. Karreelaagte, }
8. The farm Rosebery Plain (Welgevonden), for the Division of Kimberley.
9. The farm Rietpan and } for the Division of Boshof.
10. The farm Charlottesdal, }

REGULATIONS.

1. Orange River Colony Ordinance No. 52, of 1903, and Proclamation No. 3, of 1904, prohibit the introduction of any horse, gelding, mare, colt, filly, donkey, mule, bull, ox, cow, heifer, calf, sheep, goat, or ostrich into the Orange River Colony, unless the owner shall have first obtained a certificate as hereunder set forth.

2. The certificate necessary before any of the abovementioned animals can be permitted to enter the Orange River Colony is that set forth in Annexure "A" hereto, issued and signed by the Resident Magistrate, Justice of the Peace, Field-cornet, Veterinary Officer or Inspector of Sheep of the District in the Cape Colony from which such animals have come.

3. The person in charge of such animals is liable to be called upon to produce the certificate aforesaid to the Inspector of Stock at any of the Ports of Entry abovementioned, or any Justice of the Peace, Police Officer, or owner of land over which such animals may pass or be passing.

ANNEXURE "A."

I......... .... do hereby certify that the animals herein specified (horse, gelding, mare, colt, filly, donkey, mule, bull, ox, cow, heifer, calf, sheep, goat, or ostrich) are free from infectious or contagious disease, and have not been in contact with infected animals, and to the best of my knowledge and belief have not come from or through a locality where any such disease is known to exist, viz.:—

Number and general description.

Place from which sent ... .

Owner's Name and Address........

Name of Person in charge ....

Place in the Orange River Colony to which animals are sent ....

Signature of Resident Magistrate, Justice of the Peace, Field-cornet, Veterinary Surgeon or Inspector of Sheep of the District in the Cape Colony from which such animals have come ....

Place. . ...

Date......... ....

PIGS (COLONIAL AND IMPORTED).

The introduction of Colonial-bred Pigs into the Orange River Colony from Cape Colony is regulated by Government Notice No 7 of 10th July, 1905 Pigs imported into Cape Colony by sea, may be intoduced into the Orange River Colony, provided that,—

(*a*) Such Pigs are conveyed direct from the port of landing to the Orange River Colony in closed trucks, such trucks having been properly disinfected at the port of landing; and

(*b*) A certificate, signed by a qualified Veterinary Surgeon at the Port of landing that such Pigs were landed free from disease, and that the trucks in which they are conveyed were properly disinfected, accompanies each consignment and is produced at the Border Station.

Nurseries Inspection and Quarantine Act, 1905

The public are notified that, in terms of Section 3 of the Nurseries Inspection and Quarantine Act, 1905, every nursery of trees or plants of any kind (not being vegetables) grown or cultivated for the purposes of trade, or distributed for the purpose of being grown elsewhere than on the premises on which they stand, has to be registered on or before the 1st September next.

Before this date, or until the nursery concerned has been inspected under the provisions of the Act, no restriction will be placed on the movement of nursery stock.

Application for registration should be addressed to the Government Entomologist, Department of Agriculture, Cape Town, either direct or through the Resident Magistrate or Assistant Resident Magistrate of the District in which the nursery is situated; and should state:—

(1) Whether the applicant is the owner or occupier of or the party responsible for the nursery.

(2) What kind of nursery business is conducted by him—whether confined to fruit trees, to forest and ornamental trees, etc., to vines, or to florist's plants

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c. are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town.

Agricultural Miscellanea, price 6d. each. Extracts from Vols. I. to V. of *Agricultural Journal.*

Stock Farming; Artificial Grasses and Fodder for Stock; Ensilage; Dairying; Treatment of Cereal and other Crops; Viticulture and Wine Making; Forestry; Locusts and their Destruction; Possible New Industries for Cape Farmers.

Agriculture.

Wheat Production in Australia (1s. 6d.) by A. C. Macdonald; *Wheat Production in Australia (1s 6d.) by W. Halse and J. D. J. Visser; Hop Cultivation (3d.) translated by A. W. Heywood; *Agricultural Weather Forecasts (1d.); *Brak Land in Relation to Irrigation and Drainage (1d); *Poultry Raising (1d.); Tobacco Cultivation by Schenck, (3d.); Tobacco Cultivation by Bornemisza (1d.), The Velvet Bean (1d.); Potato Disease (1d)· Scheme of Manurial Experiments (1d.); Leguminous Forage Crops for Trial in Cape Colony (1d); Grasses for Trial in Cape Colony (1d.), Sundry Forage Crops for trial in Cape Colony (1d); Poultry in South Africa. Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d.); The Salt Bushes (1d.)

Dairying.

Dairy Breeds by A. C. Macdonald (9d.); *Dairy Industry in Great Britain by A. C Macdonald (6d.); †Dairy and its Products by D. Hutcheon (2d.); *Dairy Industry in Denmark (2d), Ready Reckoner for Cream Testing (1s.), †Butter and Cheddar Cheese Making (1d.)

Entomology.

The Bont Tick (1d.), Bean Bruchus 1d.; Cabbage Aphis (1d.); Codling Moth in Madeira Fruit (1d.); *Codling Moth (1d.); Citrus Psylla (1d.); Fruit Fly (1d.), Fumigation Supplies (1d.); *Cyanide Gas Remedy for Scale Insects (3d.); †Hessian Fly (1d.); Insect Friends and Foes (1d.); Methods of Locust Destruction (1d.); *Peach Yellows (1d); Pear Slug, Paris Green (1d); Remedy for Mestwurmen (1d.) *Spray Calendar (1d.); *Spray Pump Notes (1d.): Scale Insects on Ornamental Trees and Plants (1d.); Two Pine Apple Pests (1d); Tree Fumigation in California (1d.); Winter Spraying (1d.); Wattle Bag Worm (1d.); Bordeaux Mixture (1d.), Deaths Head Moth Superstition (1d.); Fumigation under Box Covers (1d.); The House Fly (1d.); Revised Plant Import Regulations (1d.); New Oak Tree Pest (1d): Nursery Inspection and Quarantine Bill (1d.); Oil Water Pumps (1d.); The Plague of Ticks (1d); Potato Tuber Moth (1d.); Treatment of Buildings with Hydrocyanic Acid Gas for Destruction of Vermin (1d.); The Codling Moth; Notes on its Life Cycle and Remedies (1d); Gall Worms in the Roots of Plants (1d); The Fruit Fly,* (with coloured plates) (3d.); *Gas Treatment for Scale Insects (3d.); Another introduced Scale Pest (1d); Washes for Red Scale (1d.). Fruit Fly. Peach Fly (1d.); Lime-Sulphur-Salt Wash for Scale Insect (1d.); Cyanide Gas Fumigation (1d.); The Fruit Moth 1d.)

Forestry.

British National Forestry (1d); Botanical Observations on Forests in Eastern Pondoland (1d.); Elementary Principles of Sylviculture or Woodcraft (1d.) National Forests (1d.); Tree Planting (5d.); *Tree Planting for Farmers (1d.); Indigenous Timbers of the Cape (1d.); Misuse of Coal and the Uses of Forests (1d); Tree Planting for Timber and Fuel (1d.)

Note.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

Fisheries.

Trout and Carp Breeding and Stocking of Streams (1d.); *Methods of Preserving Fish by Smoking (1d)

Horticulture.

Fruit Culture in the Gamtoos River Valley (1d); *Marketing of Fruit (1d); Manual of Practical Orchard Work at the Cape (6d); The Olive at the Cape (2d), Tomatoes and Fruit for Export (1d); Citrus Culture in Cape Colony: Report of the Citrus Commission (1d), *Fruit from Orchard to Buyer (1d), Netting for Fruit Trees (1d)

Veterinary and Animal Industry,

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d.); Diseases of the Horse and their treatment (1s), Horse Sickness (2d.), * Heartwater (1d); * Liver Disease among Calves (3d); Lungsickness of Cattle (1d); * Malarial Catarrhal Fever of Sheep (1d), *Preventive Vaccination against Anthrax and Swine Fever (1d), Rinderpest. Dr. Koch's Report (1d.); *Inoculation against Rinderpest (1d), Dr. Kohlstocks Report on Inoculation for Rinderpest (1d), *Redwater, Texas Fever or Tick Disease (1d.); *Redwater, Anthrax and Quarter Evil (1d.), *Scab and its Nature (3d); *Sheep and Wool (1d.), Treatment for Worms in Domestic Animals (1d.), †International Conference of Sheep Breeders (1d.), The Eye and its Diseases (1d) Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.), Heartwater in Calves (1d.), Tick Heartwater Experiments (1d.), Indigestion and Diarrhœa in Calves (1d), Persian Sheep and Heartwater (1d); Poisoning of Stock (1d), Retention of the Fœtal Membrane, or Afterbirth in Cows (1d), Stijfziekte, Lamziekte or Osteo-Malacia and Paralysis (1d), Transmission of African Coast Fever (3d), Tuberculosis and the Use of Tuberculin (1d), African Coast Fever with Description of Dipping Tank (3d), Notes on the so-called Paralysis Tick (1d), *Rinderpest in South Africa (3d) by D Hutcheon, *Fluke or Slak in Liver of Sheep (3d) - *coloured plate*, *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d.), Osteo Porosis (3d —*coloured plates.*

Viticulture.

†Reports on Viticulture (3d), *Reconstitution of Phylloxerised Vineyards (1s); Report on Failure of Hanepoot Grapes on American Vines (1d), The Making of Wine and its By-Products (6d), How to Treat Wine Casks (1d.), Failure of Vines 1d)

Miscellaneous

Game Seasons (3d), Land Laws of Cape Colony (1d.) *Monsonia the Cape Cure for Dysentery (1d), *Rainfall of South Africa (1d.), Sand Dunes of Gascony (5d); The Metric System (1d.); South African Stud Book, Constitution, Rules, &c., Transvaal Plant Import Regulations (1d)

NOTE —All those marked with * are obtainable in Dutch and English
† Dutch only

CITRUS TREES,
ORANGES, LEMONS, &c., &c

Budded from the
BEST IMPORTED and
COLONIAL VARIETIES.

Each sort is on a
Stock proved suitable
for that variety.

PRICES: 5/- each; 48/- per doz.; 350/- per 100. In tins, 7/6 each

HENRY MEYERS,
Simondium, PAARL.

WRITE FOR CATALOGUE.

THE PRODUCE MARKET

CAPE TOWN.

Mr. R. Müller supplies the following report for the month ending July 20th 1905:—

Wool.—The London wool sales opened last month with a good demand and keen competition, and the cables of the opening reported a rise at from par to 5 per cent advance. During the progress of the sales prices steadied down, and so far as Cape wools are concerned I may say there is no change to report. This is somewhat disappointing as better prices had been expected. Our market continues firm for the few odd lots that have been offered The feature of the market has been snowwhites, a fair number of parcels having been offered during the past few weeks and prices may be said to have reached a very high level, up to 1s 10¼d having been paid for Pearl Extra Supers, up to 1s. 9¼d for Supers and 1s 6d for Seconds. In Grease only oddments were offered, fetching from 6d to 7¼d. for good Karoos Long, from 5¼d. to 6¾d. for medium and scouring wools. Malmesburys, up to 6d for fair.

	s.	d	s.	d.		s.	d.	s	d.
Super Long Grass Veld Wool	0	8	0	9	Short and Inferior ..	0	4	0	5
					Wool for Washing ..	0	4½	0	6
Super Long Karroo Veld Wool	0	6¾	0	7½	Snow-white Super to Extra	1	6	1	10¼
					Ordinary	1	2	1	6
Medium Karroo Veld Wool	0	5	0	6	Fleece Washed ..	0	9	0	10

Mohair.—The very decided advance reported in my last for both Kids and Firsts has given way again to lower prices, and the demand has a good deal lessened, buyers' ideas are that they must buy at much lower prices At the same time, there is a fair amount of business doing in medium to good quality.

	s.	d.	s.	d.		s.	d.	s.	d.
Mohair, Firsts, Summer	1	0	1	3	Mohair Winter ..	0	10	1	0
,, Kids.. ..	1	3	1	6	,, ,, Kids .	1	0	1	3
,, Seconds ..	0	6½	0	10					

Ostrich Feathers—The amount of business done last month is of the usual average. Prices may be considered fairly satisfactory All pluckings showing good quality of broad and even grown wings meet with good competition.

	£	s.	d.	£	s.	d.		£	s	d	£	s	d.
Super Primes	10	10	0	35	0	0	Floss ..	0	5	0	1	10	0
Firsts, Ordinary to Super ..	8	0	0	10	10	0	Long Drabs ..	2	10	0	4	10	0
							Medium Drabs .	1	5	0	1	15	0
Seconds ..	6	0	0	9	0	0	Short to Medium	[illegible]	10	0	1	10	0
Thirds ..	3	10	0	6	0	0	Floss ..	0	2	6	1	10	0
Femina (super)	7	0	0	10	0	0	White Tails .	1	5	0	1	15	0
Femina, Seconds to Firsts ..	4	0	0	6	10	0	Coloured Tails..	0	5	0	1	10	0
							Chicks ..	0	1	0	0	2	0
Byocks (fancy) ..	5	0	0	7	10	0	Spadonas ..	2	10	0	4	0	0
Long Blacks ..	4	10	0	7	10	0							
Medium Blacks	3	0	0	3	10	0							
Short to Medium	0	10	0	2	10	0	Inferior Black & Drabs, Short to Long ..	0	0	6	1	10	0

Hides and Skins—There is a good demand for all classes of good quality. Goat Skins at the last London sales were somewhat easier.

PORT ELIZABETH

Messrs. John Daverin and Co., report under date July 14, 1905.—

Ostrich Feathers--The market was heavily supplied this week, the sale lasting two and a half days, when a fair average assortment was offered to active competition With the exception of Feminas (which were decidedly dearer) prices showed little change from those paid last week Amongst the large and valuable consignments offered was a fine plucking from the well-known camp of Messrs W E. Murray & Sons, of Roodebloem Graaff-Reinet These feathers were much admired by buyers, being well grown, of good flue, and generally free of discoloured lots, they excited keen competition, and brought high prices. The following are some of the figures realized. —Primes, £30, Feminas, £12, Fancies, £10 2s. 6d ; Long Blacks, £6 5s.; Long Drabs, £4 5s.; White Tails, £3 17s. 6d.; Coloured Tails, £2 17s.; Floss, 29s, etc. The plucking realized £1,483. The amount of business done out of hand has been but limited, buyers showing little inclination to purchase ordinary parcels, of which the bulk of present stock consists; but for anything really good there is a ready sale at extreme prices. The quantity sold on the public market this week amounted to £13,098 18s. 7d., and weighed 5,457 lbs. 14 ozs.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s	d.
Primes : Extra super				Special Prices.			Blacks : Long..	3	5	0	5	0	0
Good to super	9	0	0	12	0	0	Medium ..	1	10	6	2	15	0
Whites: Firsts	6	10	0	8	10	0	Short ..	0	10	0	1	0	0
Seconds ..	4	0	0	5	10	0	Wirey .	0	1	0	0	1	6
Thirds ..	2	10	0	4	0	0	Floss ..	0	6	0	1	7	6
Feminas : Tipped							Drabs : Long ..	1	12	6	2	15	0
and Grey ..	4	10	0	7	0	0	Medium ..	0	15	0	1	7	6
Seconds ..	2	10	0	4	0	0	Short ..	0	2	6	0	6	0
Thirds ..	1	10	0	2	10	0	Wirey ..	0	0	6	0	1	0
Fancy ..	4	5	0	6	10	0	Floss ..	0		0	1	7	6
Tails : White ..	1	7	6	2	5	[illegible]	Spadonas : Light	2	0	0	3	10	0
Light ..	1	0	0	1	10	0	Dark ..	0	12	6	1	12	6
Coloured & Dark	0	5	0	0	15	0	Chicks ..	0	0	3	0	1	6

Wool —The London sales continues to progress with a firm tone. Our market also contains firm, and the few odd lots arriving are readily sold at full prices.

Snowwhite Extra Superior ..	20d	20½d	Grease, Light, faultless, short Karroo grown	5½d	6d
Snowwhite Superior ..	17½d	19d	Grease, Short, faulty and wasty ..	4½d	4¾d
Do Good to Superior	16½d	17d	Grease, Coarse and Coloured ..	5d	5¼d
Do Inferior Faulty	15½d	16d	Scoured, Coarse and Coloured ..	6½d	10½d
Grease, Super Long, well-conditioned, Grassveld grown, special clips	7d	8d	Free State Grassveld Grease, long and well-conditioned ..	6d	6¼d
Grease, Super Long well conditioned, Grassveld grown ..	6½d	7d	Free State medium grown, light, with little fault ..	5¼d	5½d
Grease, Super Long, well-conditioned Karoo Grown ..	6d	6½d	Free State short, faulty and wasty ..	4½d	5d
Grease, Super Long, well-conditioned, Mixed Veld ..	5¾d	6½d	Free State Karroo grown, long and well-conditioned ..	5¼d	5¾d
Grease, Light, faultless, medium, Grassveld grown.. ..	6d	6¾d	Free State medium grown, light, with little fault ..	5d	5½d
Grease, Light, faultless, medium Karroo grown	5½d	6d	Free State short, faulty and wasty ..	4½d	4¾d

Mohair.—This market continues very quiet, and the only sale made in the open market during the week was one of 100 bales of super firsts at 14½d, but at present, even at this price, there is no general demand We have still every confidence in the future of the market, and hope soon to be able to advise an active demand. No business has been done in Summer Kids during the week. On Tuesday's public market a limited quantity was offered, consisting mostly of very mixed lots. The tone of the market was weak, and several lots were withdrawn without being offered.

Superior Firsts special clips	14½d	Mixed Hair ..	0s 10½d	0s 11¾d
Ordinary Firsts ..	14d	Seconds and Grey ..	0s 8½d	0s 9½d
Long Blue O.R C. Hair	None offering.	Thirds . ..	0s 6d	0s 6¼d
Super Kids ..	18d	Winter	None offering.	
Ordinary Kids ..	15d to 16d	Do. Kids ..	None offering.	

Skins.—Sheepskins sold in bundles at 7½d per lb.; Pelts at 4½d; Capes, 1s 6d, damaged, 6d each; Angoras, 7½d, Shorn, 5d; damaged, 3½d; Goat, 11d; damaged, 5¾d per lb; Springbok, 8d each.

Hides.—Sun-dried Hides sold this week at 7¾d and for damaged, 6d, Drysalted, 7d; damaged, 5¼d, and thirds, 3½d.

THE

Agricultural Journal

OF THE CAPE OF GOOD HOPE

No. 3. SEPTEMBER 1st, 1905. VOL. XXVII.

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All communications should be addressed :
"The Editor, Agricultural Journal, Department of Agriculture, Capetown."
Telegraphic Address : "Bulletin," Capetown.

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NOTES.

Prizes for Correctly Named Fruits.

We would direct the attention of all Agricultural Societies to the following resolution carried at the Fruit Growers' Congress at Oudtshoorn and adopted by the Western Province Horticultural Board: "That in consideration of so many different names being applied to the same kind of fruit, this Congress recommends the different Societies holding shows to give, as far as possible, prizes only to correctly named fruits." This resolution has been circulated among those interested and it is to be hoped it will be acted upon, if only to attempt to bring some order out of the existing confusion.

The Wine Show.

Attention is directed to the full particulars which appear in another part of this issue with reference to the Wine Show fixed to take place at Paarl next month. For the first time the wines are to be scheduled as "types" and not as the direct unmixed product of certain varieties of grapes. This system has been adopted in order to bring Cape Wines in line with the products of other countries, and enable the growers to place before the judges the article which in their opinion should prove most acceptable and consequently most marketable. By adopting the test of "types" the Cape viticulturist should be able in a few years to compare his labours with the products of the first viticultural countries in the world, and knowing the many natural advantages which the Cape has, we confidently believe that in time we should be able to more than hold our own with the best. What this should mean in the expansion of our markets we can leave to the imagination of those most concerned. Anyway it is a condition well worth striving after.

The South African Stud Book.

The last information to hand with regard to the progress of the Stud Book movement is distinctly encouraging. The Central Board has been formed at the Bloemfontein Conference and the whole work seems well on the way to a successful issue. It is to be regretted that Natal has not seen fit to join in the movement officially, though we are confident that the bulk of the stock-owners there will not fail to take advantage of it. In this Colony thanks to the untiring energy and tact of Mr. C. G. Lee, we may accept the Stud Book as an accomplished fact. The gravest difficulties in the way were those connected with the merino sheep and ostriches. These, however, seem to have been overcome with the least possible friction, and we may now look forward to a smooth career provided only that ordinary business acumen is shewn in the management. Like everything else of this description, the real success depends upon the support it receives, and it is hoped that so far as our Cape Stockbreeders are concerned there will never be any cause for complaint under this head. Some interesting details are supplied in another part of this issue by Mr. Lee which should prove good reading for all.

Swanley Horticultural College.

The visit to South Africa of the British Association has brought to this country some representatives of an institution which seems seems destined to play an important part in solving some, at least, of the many troubles which afflict South Africa. The Horticultural College, Swanley, Kent, is not much known on this side, but if it continues the good work it has taken in hand it should soon be one of the best known institutions of its class in the world. It has been established in order to fit young women for a thoroughly practical Colonial life by giving them a course of instruction in horticulture first, perhaps, but in general farming work principally. The idea seems to have grown out of the desire among many well bred educated women to take up gardening as a profession. This succeeded so well that the Colonial Training Branch has been added with the happiest results. The new-comer in a Colony is pretty severely handicapped as a rule because of the strange conditions he or she has to face; but with the training provided at Swanley it should be possible to supply the Colonies with a class of people very badly needed, viz., educated women with a full knowledge of dairy, poultry-keeping, agriculture, and other farm industries, and at the same time sufficiently informed upon farming matters to be able to keep a set of farm-books, and thus be of the greatest possible value to a new country.

It is not a new venture but has been tested by the success which has attended the footsteps of students who have gone out into the world. Our information is derived direct from Mrs. John Hopkinson, the lady who presides over the committee of the Colonial Section, and at present visiting South Africa with the British Association. The desire of the Committee is to be in a position to not only educate and train women specially for a Colonial life, but to be able to place them in suitable positions when their training is completed. To do this it will be necessary of course, to be kept in touch with the farming community in such Colonies as ours where the necessity is so urgent, so that as the occasion may arise so the person can be selected and sent out to fill the vacancy. It is confidently hoped that with the advance of the newly-born spirit of co-operation, especially in such work as dairying, orcharding, &c., suitable vacancies may arise, for it is in such an institution as a creamery where the services of specially trained assistants would be most valuable. To anyone desiring further particulars we shall be glad to furnish all the information we have, and anyone desiring to communicate direct should address Miss M. Kekewich, Horticultural College, Swanley, Kent, England.

Common Salt, Sulphur, Lime and Tar.

Colonial farmers, particularly stockmen, are so often thrown upon their own resources in the matter of cures or preventives for diseases and minor afflictions among stock, and as few articles are in more common use for such purposes than those enumerated above we think the few simple explanations supplied on another page as to the uses of them should prove of value. Mr. Hutcheon gives in a concise form the actual results which may be anticipated from the use of each, and from that it should not be a difficult matter to judge their actual value in specific cases. The article was inspired by the constant enquiries which reach us as to the advisability of using one or other, or some, if not all, in combination. The majority of these enquiries went to shew that a good many of our farmers are not quite fully informed as to the action of the simplest of the remedies they use so frequently, and are inclined to expect too much because of their common use. It is hoped that the information here supplied will clear away some at least of these misapprehensions.

Wine at Rosebank.

The attention of all interested in the wine industry is directed to the announcement in this issue giving full details of the new departure made by the Western Province Agricultural Society in its Wine Prizes for the next Rosebank Show. Following in the footsteps of the Horticultural Board the prizes are to be offered for types of wine. This should be an attraction to many who have hitherto held aloof from this contest. In addition it should be noticed that the schedule has been doubled in value so that altogether it may now be fairly argued that it is not the Society's fault if the Wine Section is not more popular than it has been. Such an excellent opportunity of advertising the wines of the country ought to be taken every advantage of, and the industry "boomed" on such an occasion—prizes or no prizes; but with such handsome inducements to make a real show, the wine merchants and growers will be to blame if they allow it to pass. The old complaint has been that growers cannot afford to keep their wines so long, but this cannot hold good in every case. There should be sufficient growers among the larger producers to put forward the finest show of wines ever seen in the country if they wished to do so, and as to the merchants, for their own sakes, they should do everything in their power to support and forward the new departure.

Natural Enemies of the Fruit Fly.

All orchardists and those interested in fruit-growing of any description will read with interest the first instalment, appearing in this issue, of Mr. Lounsbury's report on his Brazil trip. Neither he nor Mr. Fuller, the Natal Entomologist, seems to be quite satisfied that the parasites described by Mr. Compere, the Australian Entomologist, may be expected to be quite so effective as was at first supposed. Of course the whole work is in the very earliest of the experimental stages and great results have been obtained in the past from much less promising beginnings. But it does not do to be too sanguine is such matters, for though the parasite theory has worked with such excellent results with other pests it does not follow as an unalterable law that it is going to be the same with all. And even allowing that an effective parasite may exist that could be relied upon to control the fruit fly, it is early yet to accept the conclusion that the Brazilian species is going to be so effective here as to promise any real relief. The whole of the work now undertaken will be watched with the keenest interest especially the attempts being made in Natal to propagate the parasite.

Jackal-Proof Fencing.

The fascinating topic of Jackal-proof Fencing is dealt with in this issue in a most comprehensive manner. No less than three of the wire-weaving machines are discussed and described, while each is shewn to advantage by means of illustrations. These facts are supported by authoritative figures giving costs in detail, so that even the simplest person can form an idea of the whole subject. In addition to the information given in that article we have been favoured by Mr. John Arnold, of Cathcart, with a copy of the paper he read on the subject before the Gaikaland Farmers' Association, which is also published under the same heading. Mr. Arnold is a warm advocate of woven fences and shews how they can be constructed at comparatively very little more than the ordinary fence, and what is of equal importance how much they save the farmer in the course of a short while. Like Mr. Rubidge, and many others of the more advanced thinkers among our stock farmers, Mr. Arnold looks to woven fencing as one of the main factors in the rehabilitation of stock-farming in most parts of the Colony where the ravages of the jackal have been most severe. Not only does it save the flocks from these predatory creatures, but it helps largely in restoring the veld, for the grazing can be better regulated.

Poultry Management in South Africa.

The Port Elizabeth Agricultural Society is doing a great service to the Colony in the encouraging attitude it has adopted towards the Poultry industry. Not satisfied with offering a liberal prize list, at each annual show, this Society gives a special prize for the best essay on the practical side of the poultry industry, and so far this has resulted in some exceedingly valuable papers being sent in. The winner this year was Mrs. Dora Theron, of Fort Beaufort, and the entire paper is published in this issue. It deals in a sensible, practical manner with the whole subject, and is, fortunately, entirely free from the usual vice of theoretical deductions. As a contribution to the most valuable section of the literature of the subject it takes high rank.

Trout Acclimatisation.

Every farmer with a decent stream of water on his property or a good sized dam where the water supply is maintained should take an interest in trout acclimatisation. If he has not the necessary facilities on his own farm he should make an effort to interest his association in the work, provided there is any promising water within reach. This should be impressed upon all, and every Farmers' Association in the country ought to put forward some effort to help in this direction. Of course it would be little or no use making attempts in very dry districts, but there are many where nothing has yet been done, that contain the germs of promise. The whole process has been so simplified now by the ingenious device described in this issue for hatching purposes, that there can be no legitimate excuse for not attempting the work. We trust that our farmer friends with anything approaching suitable facilities will not fail to move in the matter now they have an opportunity. The cost of the floating hatching box cannot be very much, and, divided over the members of an association, would amount to scarcely anything, so that there is as little excuse on the financial side as on the practical. Considering the success which has followed the introduction of trout into many of our streams we think the least the farmers can do is to help forward the work.

Spraying *v* Dipping.

The Douglasses (pere et fils) take the field this issue in the little controversy as to the merits of Spraying .*v* Dipping. Like the interesting discussion on sheep dips which we have encouraged in the *Agricultural Journal*, this should lead to a better understanding of the whole subject. Our interest in the question reduces itself to that of tick eradication. We care not how the tick is destroyed so long as we hear of its destruction. And we feel that no better method of encouraging that crusade is to hand than by opening the pages of the *Agricultural Journal* to a full and free discussion of the various methods which have proved to be effective. We do not take the extreme view that either Dipping or Spraying have in any sense been found unsatisfactory. It is not a question of defects, but which is the more effective—the latter including, of course, economy. Now it rests with those who have worked with the different methods to champion the cause of the one they find best. If either can satisfy the whole country they will be exceedingly clever people, for, so far as experience goes, we believe it will be found, when the whole procedure of tick-killing becomes, as it ought to become, as much a part of farm work as cleaning out the stables, that the methods to be adopted will largely depend upon the surrounding circumstances.

Where dipping may suit, dipping will be adopted. Where spraying is found most suitable, that will be the accepted method. The wise man will be he who decides for himself and goes to work at once on the selected lines. For there is no time to be lost if we are going to eradicate all the ticks in the country, or even if we mean to reduce their numbers in any measurable degree.

Dipping and Diseases.

Messrs. Cooper, the sheep dip people, have set their tick eradicating experiments going on a large scale by the purchase of Gonubi Park, near East London, the property of Gen. Brabant. There is plenty of material to work upon there, for the whole section is full of ticks. The object of the experiments is to produce a dip that will kill all ticks and not injure the animals, and then the dip will be put on the market. For these purposes, Dr. S. Williamson, of the Cooper Research Laboratory, has come out especially from England to conduct the experimental work, and although he has only been installed at Gonubie Park for a few months he has already gained much experience and information. A splendid cattle dipping bath has been laid down on the Estate (close to Gonubie Bridge on the Transkei road) and the cattle on the farm—some 500 head—are being put through the bath every 14 days; the bath, needless to say, is filled with Cooper's dip. As a result, the cattle are practically free from ticks, and have tremendously improved in condition since their arrival on the scene.

General farming operations are also to be carried on. A large quantity of Paspalum Dilatatum seed has been procured from the Department of Agriculture, and special attention will be given to the cultivation of this magnificent and succulent fodder grass. Crimson clover is also being tried. Forage and Lucerne will be largely grown, and a fruit expert has visited the property and pointed out a suitable site for the orange grove which will be laid out when time and opportunity serve. Already some very good pines, oranges and naartjes, are being grown on the Estate, which in parts is eminently adapted for the production of fruit.

A small flock of merino ewes is to be sent along to Gonubie Park from the Transkei at an early date, and Messrs. Cooper are hopeful of being able by continuous dipping to solve the Heartwater trouble, which, in recent years, has made sheep farming impossible on the coast belt. Should their efforts prove successful, flocks of pure-bred sheep will later on be imported from England and Australia, and stud rams will be bred for sale. A dairy herd is to be established, and it is the intention to raise thorough-bred pigs and poultry as soon as the necessary arrangements can be made. Red-polls and Shorthorns will be imported from Messrs. Cooper's English herds, and special attention will also be paid to the breeding of Africander cattle—altogether an admirable programme. May it succeed.

FARM AND VELD.

Irrigation and "Brak."

"Apex" writes:—In many parts of this country, and especially in the Karroo, we have more or less "brak," either in the soil or in the permanent water; and the question has been asked, "What will be the result of extensive irrigation under such circumstances; will it be a permanent success or will the whole irrigated area be made absolutely useless, as we are told has been the case for several miles below the Government weir at Van Wyk's Vlei"? The answer is—The permanent success or failure depends entirely upon the kinds of crops we grow, the methods we employ in irrigation, the amount of cultivation we give these crops, and whether our lands have underground drainage either natural or artificial. It therefore behoves us to enquire into this subject before we make a start with the works, for we can check and prevent accumulation of brak, but when once it has accumulated, it is a most difficult, expensive and tedious business to get rid of it.

Wherever evaporation takes place, there the salt is left behind. We must therefore stop evaporation as much as possible. This can be done in three ways, firstly by growing only such crops as will give the greatest amount of shade for the longest time in the year, secondly by applying water as seldom as possible to the surface, and thirdly by cultivating the top three or four inches of soil after each watering, so as to stop capillary attraction and prevent the moisture rising from below.

There is no better plant than lucerne for our first requirement, as it gives shade for the whole year where it is not cropped excessively. It answers the second requirement admirably, for being one of the most deep-rooted of fodder plants, it requires heavy waterings which sink down deep, when they are out of the reach of sun and wind. Provided this is given, the roots will follow through almost any soil and when fully established they will draw sufficient moisture from this source for a crop at a long interval after the last flooding; thus shewing this plant particularly adapted to our intermittent water supply. Our third requirement is a cultivator suitable for loosening the surface of the lucerne beds after each watering. Here is an opening, perhaps for an inventor, certainly for any agricultural society which has the interest of the farmer and the country at heart. One thing is certain that the present spring tooth harrow though considerably used here for this purpose, is not the implement we want. In America the Disc harrow has found favour for this work and here though little known and less understood it has achieved considerable success, in some cases remarkable success, but it is not the implement to be played with for great damage can be done.

There is another thing which checks the accumulation of brak, this is underground drainage, which draws the water quickly from the surface, taking salt in solution with it, thus reducing the percentage of brak in the soil. Where artificial drainage is resorted to it is usual in bad cases of brak to apply more water than is necessary for plant requirements, so that after having dissolved the salts it distributes them from the surface to the drains, and the surplus water running off through them carries away a certain amount in solution, thus keeping it in check and admitting of successful plant growth where otherwise, the land would be ruined in a few years. The old Egyptian irrigators watered their lands by banking them round and filling nearly to the top when the flood came once a year, giving as much as four feet depth of water. This system kept the brak in check, and to this day is a success, but since European influence has carried so much weight in that country, other methods, more advanced, it is claimed for them, have been at work, viz : storing the water in reservoirs and doling it out right through the year in small quantities just sufficient for the crop grown. This method has brought much more ground under cultivation and is financially a great success at present, but it has already resulted in large tracts being abandoned as too salty to be of any use. This is not an isolated instance, other countries have been injured by these constant surface waterings and we should learn from their experience that our main crops must be deep-rooted, giving a maximum of shade through the year, and thriving on deep waterings at longer intervals than we practice here.

Preserved Table Olives.

A Paarl correspondent writes asking how the imported pickled olives are prepared. He says he has a good many trees on his farm, so would feel obliged for some information. Now although the olive oil industry is not very promising in this country we see no reason why preserved olives for table use should not be produced at a profit and we forwarded our correspondent the necessary information at once.

Preserved table olives, or picholives, are as easy of manipulation as the ordinary bottled fruit. (See "The Olive at the Cape," by Prof. MacOwan). The olives have to be picked before maturity, trusting the horse to the care of a boy he got too much wheat to eat, while quite green, with precaution to prevent bruising. They are placed in an earthenware jar which has been well warmed, and upon them is poured lye prepared by boiling half-a-pound of quicklime and four pounds of fresh wood ashes in a gallon and a half, or thereabouts of water The clear lye only, after subsidence, and cooling to about 150 degrees, should be used. A piece of flat stone may serve to keep the fruit down, and the berries remain in the lye for a day and a half. The liquor is then poured off and replaced by water. This is changed twice a day for three days. Then the fruit is drained, and carefully slipped into wide-mouthed jars, avoiding the least crushing. The jars are filled up with saturated solution of common salt, corked with good sound corks, over which a little melted rosin or paraffin wax is run, and a tinfoil capping tied on. Possibly, pickled olives might be prepared here wholesale, and exported in kegs for subsequent treatment and preparation for retail purchase. But the repeated handling, and rough usage, unavoidable in the scheme, renders success at least problematical.

Seed Supply.

The Secretary of a Farmers' Association—it really does not matter where—writes for information as to securing seed on account of the Association with a view to securing reliable and sound supplies. The answer is simple. The best course the Association can adopt, if it really wishes to procure good reliable seed of any sort is to communicate with the seed merchants—any reputable house can supply—asking for quotations and samples, stating at the same time the quantities required. Select those that suit according to price and appearance, then send the samples to the Agricultural Assistant, Department of Agriculture, Cape Town, to be tested. That officer will soon tell if the seeds are reliable or not and the purchases can be made accordingly. To make assurance doubly sure the merchant should be asked to guarantee his seed to be according to his description, and when the bulk parcels are delivered have samples taken and again a further test made, to see that the parcel is equal to the original sample. This may be a little troublesome perhaps, but it more than pays in the end, and should help the merchants, as well as the farmers, by compelling them to insist upon being supplied with correct varieties of seed. That is, true to description, free of adulteration and foreign matter and of good germinating power.

Sand Crack.

A Britstown correspondent writes:—"At the end of the war I bought a very valuable Colonial Horse (stallion) about 6 years old which has ever since worked without fail. In December last I took same on a 60 mile trip which he had often done before, and there and on the way home after I had given him water at the first outspanning got so "blown up" that I had to outspan him and lead him home which he scarcely reached. Anyhow with soda and enemas I brought him round again and he did his work as usual. Last month I took him on a 30 mile trip and on his return I noticed he was quite lame, and on the inside of his front hoof I found a long crack in the hoof. It seems to be only in the newly grown part of the hoof after his sickness. I have rubbed the crown of the hoof with embrocation, and had the crack daily washed out with lukewarm water and carbolic soap and then had coal tar rubbed all over the hoof and particularly in the crack. When the horse came from his last trip the crack on the crown was bleeding. I had the shoes taken off and never worked the horse any more and in the day time I let him run in a soft sand yard. At night he stands in a dry stable with lots of bedding. I also had at the bottom of the crack an inverted V burnt in the hoof as advised in Elliman's book but I cannot see any improvement yet in the horse. He is still lame and the cracks don't outgrow."

The horse is suffering from a severe "sand-crack," which may be traced to the laminitis set up by the attack of tympanitic colic, or "blown up," mentioned by our correspondent. Mr. D. Hutcheon, Acting Director of Agriculture, in "Diseases of the Horse and their Treatment," recommends the following treatment:—"The first thing is to clean out the crack and remove carefully all sand or dirt which may have got into it. If the crack is in the toe of a hind foot, get a shoe made with two toe-clips, one on each side of the crack, and fit the shoe in such a manner, by reducing the wall of the hoof, that the toe does not rest on the shoe underneath the crack. If the crack is in the inside quarter of a fore foot, put a bar shoe on, removing the bearing off the foot immediately under the crack in the same manner. If it can be done satisfactorily, put a clip on the bar shoe, to clasp the hoof immediately behind the crack, at any rate, in all cases remove the bearing from under the crack. If there is acute pain and lameness, place the foot for some hours in hot water, and see that no dirt or matter is left in the crack; it may be necessary to pare out the edges of the crack to do this. After keeping the foot as long as possible in hot water, place it in a hot poultice, and keep up the poulticing until the pain and lameness have ceased. After that is accomplished, the next consideration is how to arrest the further continuation of the crack from the coronet; the crack will not unite, and unless it is stopped at the top, it will continue a crack. There are various methods adopted for doing this, the common one in the Colony is to fire a straight line across the crack at the top, but unless the crack is completely obliterated at the coronet, this plan does not succeed.

"A very simple plan is to cut out a V shaped piece of horn at the top of the crack. With a fine pointed drawing knife, make two grooves, like the letter V, the apex of the triangle is in the crack, about, 1½ inch from the top, while each limb is about ¼ of an inch on each side of the crack at the coronet. After having cut out this triangular groove with the knife, cut out the whole of the horn within the triangle, removing every appearance of the crack, from the coronet down to the apex. This will necessitate the careful paring off of the whole of the horn down to the quick, but do not make it bleed, if possible. Then heat a firing iron, and with it fire the edges of the V especially at the apex, where you must completely separate between the open crack below, and the part which is cut out above. Care must be exercised not to go too deep at first, still, go as deep as possible, as a complete separation has to be made, or the crack will extend up again. After having done that, rub some cantharides blister on to the coronet, to stimulate the growth of healthy horn, and give the horse a rest for a week or two. Make sure afterwards that there is a complete separation between the crack, and the triangular part which is cut out. I have never failed in completely curing a crack by this method, and I have never stripped off the horn completely, as is recommended in many books.

"If a crack is noticed in time, before it has extended far down the wall, or deep through the horny laminæ, all that may be necessary, is to draw the firing iron right across the crack about a quarter of an inch from the coronet, and then cut the horn completely out immediately above it. No crack should be left above the groove made by the firing iron, the horn must grow down whole from the coronet. Nailing and clasping the cracks are successfully done, but these operations require some skill, and those who can perform them require no advice from me."

Topping Vines.

A correspondent writes for information on the topping of vines. In Graaff-Reinet, he says, serious mischief is often done to the grape by reckless topping. Hot winds and hot sun ruin the bunch when the natural protection of the leaves is torn off. The necessity for leaves to elaborate sap to feed the fruit is ignored, and too often the mischief done to the crop is laid to the want of water. No growth of stem or development of grape is possible without the leaf crop. My attention has been drawn to this question from seeing young vines put out by farmers for trellis covering, and noting the starved growth, long thin stems up to the trellis support, but no vigour or wood to bear. On enquiry I find that the seller had advised all shoots on the uprising stem to be rubbed out, the reason given being to make the top growth. To my thinking the wrong way to grow the stem of a climber is to cut off all leaves and growth that tend to make the stems grow; time enough to do this pruning by checking tip growth and cutting off later on when it has done its service.

The late J. P. De Waal, in his work, "The Culture of the Vine," offers the following remarks on this subject:—"By the term 'topping' we understand the cutting off of the tops of the young vine shoots when they have reached a certain stage of development. Until the young vine comes into bearing, the shoots should be topped as little as possible, as a heavy foliage will produce strong wood growth and is practically as beneficial to the young vine as a heavy manuring. Supposing a farmer manures his young vines heavily, but keeps topping them very short, as the writer has not infrequently observed, he is largely taking away with the one hand what he has been supplying with the other. The result is that his young vines will remain dwarfish and make very slow progress. One need only watch the effect of frequent topping on hedge plants to see how stunted they get in their growth. The reason given for this short topping is to prevent damage from strong wind. Whilst a certain amount of topping against wind-storms is admitted to be necessary, there is no doubt that the practice is often overdone. There are other safeguards against wind-storms besides short topping, such as earthing-up and staking of the young vines and the erection or planting of wind-screens.

"Excessive topping is equally harmful to older vines that are in bearing, but a reasonable amount of topping is required to keep the vine within certain limits necessary for carrying on the vineyard work, more especially when the vines are trained low, on the bush-system already described. Bearing vines, low on the ground, require more topping than old vines with a stem, as one of the objects of topping, in the case of low vines, is to make the shoots stand up and keep the grapes off the ground. In the case of bearing vines, the object is not so much wood growth as the production of fruit, and a judicious topping causes the sap, which would otherwise have passed on to the end of the shoot, to divert into the bunches of grapes, which are thereby noticeably developed.

"Topping should commence shortly after the flowering period of the grapes, when the shoots are about eighteen inches long, and is then best performed with a long-bladed sharp knife. Later in the season, when the shoots become woody, a sickle can be used. In wet years, heavier topping is required towards the close of the growing period than otherwise, the object being to let the grapes get the maximum benefit of the sun's heat for the double purpose of ripening them and of checking the spread of oïdium; but the grapes should, nevertheless, in such seasons also be sufficiently shaded by the trees to prevent the rays of the sun from falling on them directly, both for the purpose of preventing them from being directly damaged through getting sun-scorched, or indirectly (in case of wine grapes not intended for the production of sweet wines) through the constituents of the berries undergoing chemical changes which unfavourably affect the quality of the resulting wine."

Poultry Pointers.

To be sure of making a larger profit year by year, you should remember and observe the following rules:—

1. Never breed from birds which have been cured, apparently, of roup, dropsy, liver disease, or consumption.

2. Always be careful to give your stock plenty of clean, fresh water at least once a day, so that they need not drink any filthy stuff they may come across.

3. Be sure that your poultry houses are well built and thoroughly ventilated, but are not in the least degree draughty.

4. Be most careful to see that these houses are kept clean and sweet, and free from vermin of all kinds.

5. Breed only from those of your hens which lay best, weed out each year those which, either by reason of the small size of their eggs, or from their inferior laying capacities, cannot be termed really profitable.

6. Remember that brains and energy, coupled with a careful attention to details, are more valuable than the practice of false economy, whether as regards money or time.

7. Above all else, remember that unless your birds have a proper supply of clean water and suitable foods, they cannot lay eggs, however well they may have been bred for the purpose.

8. Do not forget that as birds have no teeth, and in order that they may properly masticate their food, and so keep free from indigestion and liver disease, hard grit of some kind must be found for them. The cry, "My birds can get grit for themselves" is untrue; fowls are not quarrymen; and they cannot get more grit than is actually on the surface, while only certain sizes of this are of any real good.—*Journal of the Board of Agriculture.*

Pigs and Dirt.

The pig is usually regarded as a filthy animal, but such is not the case. If a pig is put into a new pen or a small paddock, you will see all the excrements in the farther corner, and if the floor is of earth, the pig will be continually rooting in an effort to obtain fresh dirt and thus get rid of the filth. These are both evidences that the pig is not naturally a filthy animal, and if he wallows in filth it is because he is compelled to do so. When it is necessary to pen up pigs, put them in a movable pen, which can be changed on to fresh ground every day, and thus avoid so much filth inside the pen.

Pig Feeding.

The chief end of the pig is—pork; or in other words, the weight and quality of his carcase. His value depends upon his being well grown and then fattened, and the object aimed at during his whole life is to prepare him for that event. He is a Christian, according to the preacher who absent-mindedly said that the end of life was to be fit to be killed. If he fails in that, he is a failure. Pasture is the cheapest way to grow a pig, and grain, pollard, peas and potatoes, with milk, if possible, is the proper food for fattening. The fattening process is, to some extent, a disease, and if too long continued, is always so, hence the necessity of a good supply of vegetable and light food. When taken from grass or other bulky diet, to be fattened, the change tô a more concentrated food should be gradual, as too sudden a change is often attended with serious effects.

Brood Sows.

A good brood sow should be large, long and deep bodied and wide, with plenty of room for a litter. The head should be of medium size, neat and clean, and have an intelligent look, with nose short and ears nicely dropping and far apart. The legs ought to be straight, symmetrical and long enough to carry the udder from the ground, also should they stand on the side of the body, that is, not be dished inward or stand close together. Medium-sized bone is generally the best. A large heart girth is very essential, being indicative of well-developed lungs, which are necessary. Above all a quiet disposition is preferred. Let a sow be nervous, fretful and bark at everybody who comes near her, and the probabilities are that the pigs will be wild and hard to handle.

To have Pure Milk.

Every dairyman knows that the main cause of impure milk is uncleanliness, dirty cows, dirty yards, dirty milkers, dirty cans. Dirt and pure milk are irreconcilable; pure milk must be clean milk. Dirt and harmful bacteria are inseparably associated, and dirt and disagreeable odours generally go together. In relation to milk, bacteria may be classified as harmless, beneficial and harmful. Most bacteria find in milk an ideal medium for growth, when the temperature is favourable. Upon the temperature depends the rate of growth. When milk is cooled to 50 deg. or lower, growth is very slow, and some species do not multiply at all. Milk is also very susceptible to taints from disagreeble odours. Bearing in mind the connection between harmful bacteria and dirt, and between gaseous taints and dirt, the importance of cleanliness should be appreciated in handling milk.

Milking Clean.

One of the things "worth doing well" is milking the cows. Why a cow ought to be milked clean every time is too old a story, and has too many arguments to back it up, to make a lecture necessary every time it is mentioned. But its importance cannot be brought out too frequently. It looks like a little thing to some men to slight a cow because she is a "tedious" milker; and it may be more convenient to leave a quart of strippings in the udder than to put up with the side-stepping and tail-swinging agitation of a "nervous critter;" but the owner of a good cow might better have a "hand" who will steal from him than one who doesn't milk the cows clean. He not only loses much of the richest milk—that is, perhaps, the least of the objections to such neglect—but the practice of leaving milk in the udder has a deteriorating influence on the capacity of the cow. The longer it goes on the less milk she gives. And the small yield soon becomes chronic.—*Australian Farm and Home.*

EXTRA TROPICAL FORESTRY.

Being Notes on Timber and other Trees cultivated in South Africa and in the Extra-Tropical Forests of other Countries.

By D. E. Hutchins, F. R. Met. Soc., Conservator of Forests,
Cape Town.

(*Continued from page* 192.)

MIDDLE DISTRICTS OF NATAL.

As regards the middle districts of Natal it is difficult to avoid saying too much. Broadly speaking, this strip of fertile country may be said to run through Natal; and Maritzburg, in elevation and distance from the sea, marks approximately the southern boundary of it. The indigenous forest here passes through the country in what is known as the Yellowwood belt. This fertile area is somewhat broken by dry lowlands. It is seen at its best on the ridges which catch the mist, and the topography of the country marks out two or three sufficiently clear mist belts running through the fertile central districts. It is from these central districts that Natal has earned its name of the "garden colony." In the more favoured parts of the central districts of Natal are localities in which may be seen flourishing nearly every extra-tropical timber tree. Before visiting the country I was prepared to find only those from summer rainfall areas, but the Natal mist belts, like the Woodbush and other mountainous areas on the east of the Transvaal, are sufficiently supplied with mist in winter and with early rains in spring to almost entitle them to be reckoned as an all-the-year-round rainfall area. Thus I was surprised to see growing (so far) in perfect vigour, many trees from winter rainfall areas, such as Cluster-pine (*Pinus pinaster*), Cork Oak (*Quercus suber*), Carob (*Ceratonia siliqua*), *Cupressus macrocarpa, Pinus canariensis*; and along with these, trees more perfectly adapted to the climate, such as *Cedrus deodara,* the eastern Eucalypts of the New England plateau country and the Bunya-bunya or *Araucaria bidwilli.* This and Deodar are probably the most valuable of the country's timber growing assets. At Mr. Bayne's unique estates near Richmond, I was particularly struck with the growth of Bunya-bunya (*Araucaria bidwilli*) and its fine yield of nuts which were remarkable for their size and abundance. To rake them off the ground recalled at once the acorn season among the old oaks of the Cape Peninsula and the south-west of Cape Colony. As a tree of magnificent growth and of first rate sylvicultural importance one may cite the Blackwood (*Acacia melanoxylon*). On my tour with Mr. Sim, the Conservator of Forests, I noticed two varieties of this remarkable tree, one resembling a vigorous, well-grown, Cape tree; and the other with foliage larger and even denser than the ordinary Blackwood. I noticed numerous fine specimens of Camphor (*Cinnamomum* *camphora*) running up to large vigorous growing trees, which are only surpassed in their dimensions by the historical Camphor trees at Somerset West in Cape Colony. Of the pines that should be given extended trial in the middle districts of Natal are *Pinus longifolia* of the Himalayas, *Pinus thunbergii* (and to a less extent *P. densiflora*) of Japan. *P. massoniana* of China, the four American pitch-pines—*P. palustris. P. mitis, P. cubensis* and *P. taeda*; *P. Khasya* from the mountains of Burmah, *P. yunansis, P. armandi* from Yunan, *P. montezuma,* and perhaps *P. teocote* and *P. ternifolia* from Mexico. It should be noted that *Pinus longifolia* and some of the American Pitch-pines are already growing well in Natal and that the bulk of the timber now imported to Natal is coniferous.

The most interesting collection of trees in this fertile Natal country and one of the most remarkable private collections in South Africa is that formed by the late Mr. Wilkieson at his estate near Maritzburg. This locality is evidently a favourable one. All the year round moisture conditions are ensured by its situation on the side of a mountain and the fact that there is abundant irrigation water. I was happily able to visit this locality twice, and during that time scarcely found a tree that was not growing well. Kari, *Euc. diversicolor,* a purely winter rainfall tree, here appeared in huge bulk, and there were singularly fine specimens of the Blue-gum (*Eucalyptus globulus*). It was impossible to avoid the reflection that here, within an hour's drive of the capital, was the site for a national arboretum that might be to Maritzburg what Tokai is to Cape Town.

I have already described, and full details will be given later under *Acacia decurrens* (Black Wattle), the really remarkable results that have been achieved by the planting of this tree, in the middle districts of Natal.

It is difficult to exaggerate the vigour with which Black Wattle grows along the mist belts of Natal; and the Black Wattle being a tree of the south and eastern districts of Australia is in every way climatically suited to its adopted home in Natal. The gross returns from these plantations represent at present in round figures an amount of £100,000 per annum—£75,000 for bark exported and £25,000 for poles used locally and sent to the Transvaal mines. The average yield is set down at five tons of dry bark and thirty tons of dry timber per acre, worth £6 to £6 10s. per ton for the bark, and up to £1 per ton for fuel. Wattle plantations comprise an area of about 25,000 acres, and there is another area of about 5,000 acres planted with Eucalypts and other timber trees, mostly in the middle districts.

A word of warning is necessary with regard to the planting of climatically unsuitable trees in Natal. Speaking broadly, while there has been splendid success generally, hardly any of the farms that have gone in for tree-planting, are free from quite obvious and unnecessary failures. Sometimes the unsuitable trees have died off at once, but in other cases (and these are the most disheartening) failure came later. *Pinus insignis* grew surprisingly well at first and thus tempted tree planters to plant it largely. Then came the oftrepeated tale of disease and failure, with the gamut of nostrums and quack advice. When I was in Natal I heard bitter complaints of the failure of *Pinus insignis*, and I saw many trees that were failing. In most localities in Natal *Pinus insignis* has become diseased, and when it has reached a certain maturity without disease they complain that the wood is woolly, worthless stuff. *Pinus insignis* is a winter rainfall coast tree. To plant it on highlands with a nearly pure summer rainfall is naturally to court failure. Attempts have also been made to plant Jarrah (*Eucalyptus marginata*): this again is a winter rainfall coast tree. Kari (*Eucalyptus diversicolor*) has also been planted, and in favourable situations has succeeded better than Jarrah. It is, nevertheless, exceedingly unwise to plant such a doubtful tree as Kari, with all the best Eucalypts of the eastern side of Australia to choose from. *Cupressus macrocarpa* has been largely planted, and I saw some handsome trees of this species. Mr. Lister, in his Natal Forestry Report for 1902, mentions a tree which, at sixteen years of age, was nearly 60 feet high and 2 feet in circumference. This is a winter rainfall tree, and though it has much power of adapting itself to all climatic conditions, it may fail after many years, as has been the case in the Eastern Districts of Cape Colony and the "Conquered Territory" of Orangia. *Cupressus lusitanica* grows generally with greater vigour than *C. macrocarpa*, and is better suited climatically. The closely allied *C. torulosa* perhaps grows as well. It is difficult to distinguish these two trees under cultivation.

Japanese trees, which one would expect to do so well in the middle districts of Natal, have not been much planted. Of the noble Japanese Cedar *Cryptomeria japonica* I saw only a few young trees; of Japan's choicest timber tree *Cupressus obtusa* (*Retinospora* of British gardens), I saw only rare specimens, and the same remark applies to the only less valuable Japanese Cedar *Cupressus pisifera*. It is curious to reflect how different would have been to-day the Forestry of Natal if the energy expended on planting *Pinus insignis* had been bestowed on *Pinus thunbergii*. That remarkable tree *Zelkova keaki* seems as yet to have had no adequate trial in Natal. This is the most largely planted and the most highly-valued of all the non-coniferous timbers of Japan.

In no part of South Africa is there so much private tree-planting on farms, or so interesting a variety of trees, as in these favoured middle districts of Natal. Mr. Lister, Conservator of Forests, King William's Town, who spent some time in Natal two years ago, particularly mentions Mr. Geike's plantations near Kar Kloof, and the Homelacy plantations near Greytown. The Homelacy plantations are the largest in area, but Kar Kloof is the finest private arboretum in Natal, and covers an area of 600 or 700 acres.

In the *Natal Agricultural Journal* for November, 1904, the following notes are given regarding the growth of trees on Mr. Menne's farm, near Grey Town, 3,600 feet elevation. The Hickory trees do very well. *Pinus insignis* grew 100 feet in 30 years. *Robinia pseudacacia*, Ash, Maple and Birch failed. Various species of Cypress all do well. *Tilia americana* does very well and forms a handsome ornamental tree. *Liriodendron tulipifera* and *Platanus occidentalis* do fairly well, while *Cryptomeria japonica* fails on Mr. Menne's farm, but grows well on another farm 1,000 feet higher.

For further information regarding the forest trees of Natal the reader may consult a recent report by Mr. J. S. Lister, Maritzburg, 1902, and an older, but particularly able report by Mr. H. G. Fourcade, Maritzburg, 1888. Numerous interesting notes on the timber trees of Natal have appeared from time to time in the *Natal Agricultural Journal*, the best of these from the pen of the able officer who has been recently appointed as head of the Natal Forest Department, Mr. T. R. Sim

NATAL.

(Upper Districts).

The upper districts of Natal bordering the Transvaal have so great a resemblance to the eastern districts of the Transvaal that it is unnecessary to specially mention them here.

TRANSVAAL.

Climate.

In the Transvaal we see the largest development of the South African plateau country. It is the highest and best-watered part of the plateau country. It lies just outside the tropic, and in latitude and altitude compares closely with the Mexican plateau. If we consider the southern and eastern coast districts of South Africa as the first great tree-growing region, the fertile Transvaal plateau forms the second great tree-growing region. On the coast districts and the coast uplands, such as the middle districts of Natal, we have favoured tree-growing regions where every extra-tropical tree will flourish. In the Transvaal the dry winters with their excessive radiation—warm sun by day and biting frosts by night—and the dry spring-time, limit the selection of trees.

Going northward from Cape Colony to the Transvaal, it will at once be noted that the South-east Trade wind increases in volume and duration, drawn inwards by the heated Kalahari Desert, and blowing with the increased strength and steadiness of the latitude. The damp winds from the Indian Ocean blow with a monsoonal tendency, and water the Transvaal with summer rains, which are as abundant, though not so steady, as the winter rains brought to the western and southern coasts of Cape Colony by the western storms of the "roaring forties." But the rainfall, though equal in amount to the best-watered parts of Cape Colony, is, as regards vegetation, less, owing to the fierce evaporation on an elevated plateau in this low latitude. The conditions, moisture in the soil, and keen evaporation in the air, are stimulating to tree growth, perhaps as stimulating as is the climate at the higher elevations to Europeans. But it will be perceived at once that the stimulating vegetative climate is peculiar and differs widely in all its aspects from the mild coast climates. At frequent intervals the drain on subsoil moisture may be exhaustive and fatal to trees unable to defend themselves against it by entering into a state of repose. Hence we see an extraordinarily rapid, but often short-lived, vegetation, in trees brought up from the coast, and a tendency for these trees to grow better when planted singly or sparsely than in dense masses where the drain on sub-soil moisture is more active.

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Wild Chesnut (*Calodendron capense*)

The varying elevation of the plateau naturally introduces a great element of variation in the climate, and joined to this is the peculiarity of situation seen in Northern Africa, namely, the ocean on one side and the desert on the other, but Algeria feels the desert more than the Transvaal, owing to the different wind systems of the two countries. Algeria lies within the influence of the western winter storms for the greater part of the year, Transvaal within the summer rains of the S.E. Trade winds. The great mass of the Transvaal plateau lies at an elevation of between 4,000 and 6,000 ft. above level. The elevation declines in the north, the rainfall in the west.

RAINFALL.

Along the eastern border there is a belt of heavy rainfall and much mist. Sometimes, at Pilgrim's Rest and Belvedere, the sun is scarcely seen for a month, and even in winter along these eastern highlands there are dense mists and drizzling rains, which keep the forest always damp. These mists and light rains do not penetrate inland in winter, where there is never enough rain to influence vegetation, and where sometimes there is not a drop of rain during the four winter months and no useful rain for the six or seven winter months. On the northern border at 1,750 ft. elevation there is only 15 inches of rain. At Klerksdorp and the western border only 20 inches, while at Pilgrim's Rest, eastern border, elevation 3,900 ft., there is 41 inches. The variation in the year's rainfall is less than might be expected, and in fact no more than is common in more temperate climates, viz., the minimum about half the maximum.

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Black Ironwood (*Olea laurifolia*).

		DRIEST.	WETTEST.
Johannesburg	season	1889-90, 21·66 in.	1890-91, 43·39 in.
Pilgrim's Rest	"	1891-92, 34·34 in.	1893-94, 54 57 in.
Ermelo	"	1898-99, 18·69 in.	1900 01, 36 75 in.
Pretoria	"	1898-99, 19·19 in.	1893-94, 36 33 in.

The rainfall in one month (March, 1904) at Speloaken, in the Northern Transvaal, was 33·19 inches —(*Met. Dep. Rep., 1903.*)

In November the rains set in steadily and continue, with breaks, till April. The rain, as in Mexico, mostly falls in the form of afternoon thunder showers. The governing factor in both the distribution and intensity of these summer rains is the S E. Trade-wind Rain in the Transvaal fails when the S.E Trade is either weak or deflected. The Cape weather cycles also have an influence on Transvaal weather, but to what extent is not yet known

While the S.E. Trade-wind brings the moisture to the Transvaal, the precipitation of the moisture is caused either by storms or mountain ranges Hence the heaviest rainfalls occur along the eastern edge of the plateau, and it is here that there are situated the most favourable sites for timber plantations, and the future timber supplies of the Transvaal In the north-east of the Transvaal, between 4,000 and 6 500 feet, occur the best watered parts of the country, and here also is the pleasant sight of from 50 to 70 square miles of large-timbered indigenous forest, which scarcely differs from the same forest at Knysna or in the so-called Yellow-wood belt of Natal

After the S E. Trade-winds have been drained of much of their moisture they pass over the plateau and are there precipated in the form of thunder showers. It is probable that these thunder showers accompany low pressure systems, and it is possible that these low pressure systems may travel eastward from Natal It has been confidently asserted that rain in the Transvaal can be readily predicted from Natal I am inclined to think that this may be the case, at any rate towards midsummer. At that time of the year the ordinary eastward travelling depressions of cold countries are very weak, even in Cape latitudes, and it is quite conceivable that they do not, then have any influence on the weather of the Transvaal While, on the other hand, Meldrum's diagrams show several tropical cyclones travelling westward from Mauritius to the African coast, then bending south and curving round to the easterly storm-track of more southern latitudes The Isidenge tornado of 1886 and the stormy weather in the S.E of Cape Colony were connected with disturbed weather at Mauritius. (Transvaal Forest Rep , 1903, by the Author)

Johannesburg,—Joubert Park.

Mean total rainfall for the period 1888—1904 (17 years) was 30·64 inches distributed over 85·6 days.

This is an 8 in. gauge. The rim of the gauge being only 2 ft. 9 in. above the ground, there is probably some small excess from splash. The sheltered situation would also afford higher readings. Some gaps in this chain of figures have been filled in from neighbouring stations.

Schroeder's Hof—Letombo (Swazieland.)

Mean total rainfall for the period 1898—1903 (6 years), was 28·27 inches.

Zuurbekom Pumping Station, near Johannesburg.

Mean total rainfall for the period 1898 to 1904 (7 years) was 26·85 inches distributed over 77·5 days.

Modderfontein Dynamite Factory.

Mean total rainfall for the period 1897—1904 (8 years) was 24·96 inches distributed over 83·6 days.

AVERAGE RAINFALL.

Month.	Joh'burg 5,750 feet		Pretoria 4,500 feet		Ermelo 5,150 feet.		Klerksdorp 4,350 feet		Kaapsche Hoop.		Pilgrim's Rest 3,900 feet		Sabie. 3,850 feet		Northern Border. 1,750 feet.		Barberton. 2,920 feet.	
	In	Days	In	Days	In.	Days	In	Days.	In.	Days	In	Days.	In	Days.	In	Days.	In.	Days
July ..	0·23	0·9	0·06	0·9	0·03	0·2	0·11	0·6	0·31		0·28		0·10	11	0·00	0·0	0·15	
August ..	0·34	1·4	0·16	1·5	0·15	0·5	0·24	0·9	0·99		0·43		0·30	22	0·02	0·2	0·66	
September ..	0·98	3·3	0·99	3·5	0·59	1·7	0·56	1·7	1·83		1·42		1·19	42	0·27	0·5	1·28	
October ..	2·09	7·8	1·80	7·8	2·67	6·2	1·57	2·3	3·44		1·95		2·94	11·2	0·74	5·7	2·10	
November ..	3·96	7·9	4·26	12·1	3·82	9·0	2·07	4·0	6·16		4·28		5·48	15·8	2·93	8·7	4·79	
December ..	4·75	13·3	3·92	13·4	4·83	8·3	2·53	5·6	8·54		5·53		5·88	13·2	2·33	5·0	4·71	
January ..	6·41	14·0	6·07	14·4	4·85	8·8	5·03	8·6	9·92		8·58		8·85	16·2	4·75	6·7	6·83	
February ..	4·87	10·4	3·77	10·4	4·29	7·2	2·42	6·0	7·89		7·96		4·86	14·0	1·59	3·0	4·24	
March ..	4·09	10·8	3·33	11·6	3·13	7·6	2·83	6·2	9·00		7·20		4·71	16·7	1·34	3·0	4·53	
April	2·29	7·3	1·25	6·5	1·87	3·2	1·73	4·2	2·31		2·08		2·21	9·3	1·06	1·3	2·11	
May	0·73	3·5	0·54	2·8	0·80	2·3	0·59	1·5	1·13		1·06		0·92	4·0	0·25	0·2	1·36	
June	0·16	1·1	0·15	1·2	0·23	1·0	0·14	0·7	0·46		0·42		0·44	1·0	0·03	1·0	0·21	
Average Total .	30·90		26·31		27·28		19·81		51·98		41·19		37·88		15·31		33·00	
Number of years ..	13-14		14		6-7		5		8		14		4		5		14	
					Mean total of 9 years 26·58		Mean total of 11 years 19·67						Mean total of 5 years 39·54					

Mean total rainfall for period 1900—1904 (4 years) was 24·89 inches distributed over 86 days.

EVAPORATION.

This subject, so important in the climatology of the Transvaal is discussed by Mr. E. J. Laschinger (*Journ. S.A. Ass. of Eng., vol 2.*) It will be seen that he arrives at a total of 63 inches for average conditions of wind and exposure. The Transvaal Met. Dept. in the yearly report for 1903 quotes 65 inches as a general average. (For Johannesburg this figure is nearly the same as the average humidity; see below.) Outside Johannesburg evaporation has not yet been gauged. In the forest on the Eastern frontier it would probably not amount to one quarter of this figure. In the hot dry country to the north-west it would be more. Mr. Laschinger describes the Johannesburg evaporation thus:—

The average evaporation from the surface of water in fairly large bodies may be taken as follows:—

PROBABLE EVAPORATION ON THE WITWATERSRAND.

Month.	Evaporation in Inches.	
January	8 0	Maximum.
February	6·5	
March	5·5	
April	4·0	
May...	3·0	
June	2.9	Minimum.
July	3·0	
August	3·6	
September	4 8	
October	6 4	
November	7·2	
December	7·8	
Total for Year	63·0	

The rate of evaporation varies very much, no matter how compared—whether we set a month in one year against the same month of another year, or one day against another, or whether we set one hour against another. In fact, the evaporation varies as much as the rainfall. Mr. Laschinger has observed an evaporation of 0·342 inches in 24 hours from the surface of a dam, of which about ¼ inch was evaporated in three hours. The mean daily evaporation curve he adds is wonderfully symmetrical and shows a maximum rate of evaporation at 2.30 p.m.

AVERAGE HUMIDITY—8 A.M., JOHANNESBURG.

Month.	Percentage of Saturation.
January	70·8
February	72·4
March	75·2
April	73·3
May	71·9

Month	Percentage of Saturation
June	69·5
July	64·8
August	64·0
September	60·1
October	63·5
November	64·8
December	69·1
Average for Year	68·3
Maximum humidity	100 per cent.
Minimum observed humidity	14 per cent.

These figures shew that the air at Johannesburg is most humid in the month of March and driest in September, and that the air is on the average very dry all the year round.

The above are Mr. Laschinger's figures. It will be noted that his average percentage of saturation at 8 a.m. and his average yearly evaporation are nearly the same figure, viz., average humidity 68 and average yearly evaporation 63. The Met. Dept. state the average humidity at Johannesburg, as varying from 60 per cent. in September to 75 per cent. in March.

BAROMETER.

It is worthy of note that the barometer is wonderfully steady, and the extreme variation is small. During the dry or winter months the barometer is so steady that rough levelling with an aneroid barometer gives very good results, and this very convenient method of levelling can be relied upon if conducted at that time of the year. —(E. J. Laschinger.)

TEMPERATURES.

The shade temperature curve is similar in shape to the humidity curve.

Temperature Summary (Joubert Park, Johannesburg).

MONTH	Aver. Max. Temp (day).	Aver. Min. Temp (night).	Average Temp
	°F.	°F.	°F.
January	80·6	56·4	68 5
February	80 3	55 6	67·9
March	77·9	54·3	66·1
April	73·5	48·5	61 5
May	67·5	40·9	54·2
June	62 4	35·5	48·9
July	62·9	35·7	49 3
August	67·4	40·6	54·0
September	74 7	46 0	60·3
October	78·8	50·6	64·7
November	80·0	53·3	66·6
December	81·3	56·3	68·8

Mean annual temperature	60·9° F.
Highest recorded day temperature (shade) ...	96° F.
Lowest recorded night temperature ...	21° F.
Average coldest month	June.
Average warmest month	December.

Belfast, on the Delagoa Bay Railway, is 700 ft. higher than Johannesburg, with a mean temperature of about 58° Fah. There are occasionally heavy falls of snow, and rarely a night in winter without frost. Snow falls occasionally at Johannesburg, but very rarely more than enough to whiten the ground for a few hours. On the high veld generally night frosts begin in April, and last till October. From Belfast and Johannesburg, which are on the highest part of the Transvaal plateau, the temperature falls with decreasing elevation and latitude. Thus the mean temperature of Pietersburg, in the N.E. Transvaal, is stated at about 67°, and Komati Poort at about 72° (Met. Dept.).

RANGE OF TEMPERATURE.

The Transvaal, like other plateaux in low latitudes, shews a moderate difference of temperature between summer and winter, a large difference between day and night. The difference between the mean summer and winter temperatures of Johannesburg is 20 deg., which is about one-third higher than the similarly situated plateau of Mexico, Mexico having the sea on two sides, while the Transvaal has a desert on its western side. The 20 deg. range at Johannesburg may be compared with 23·5 at London, England, and with 14·34 the seasonal range at the Cape Observatory. June and July are the coldest months in Johannesburg, with a mean temperature of 49 deg.; December and January the hottest, with a mean temperature of 69 deg. The summer temperature of Johannesburg is the same as the Cape Peninsula, the winter temperature 5 deg. colder; but the shorter winter and longer summer of Johannesburg combine to give it a mean temperature barely 1 deg. lower than that of the Cape Peninsula, *i.e.*, 61 degrees.

WINTER.

In the Transvaal they speak of *two months winter and two months wind*. During May and part of June and July the evaporation from the moisture in the ground after the summer rains and the comparatively low sun combine to establish the continental anti-cyclonic type of weather, with cold frosty nights and beautiful, bright, still days. During August and part of July and September the increasing power of the sun breaks up the anti-cyclone, and the ordinary eastward travelling winter storms of the Cape sweep across the country with terrible dust in all the large towns, and alternations of warm and cold winds. In the Transvaal there are no hot winds, at any time, as in the south. Anything like the hot berg wind of the south coast of Cape Colony is naturally impossible.

SPRING—THE BAD SEASON.

September and October, the spring months in the Transvaal, are the worst time for trees, and the least pleasant for Europeans. The S.E. Trade wind with its rains is heating up, and the weather is often described as the most oppressive and unpleasant of the year. It may be likened to the breaking of the monsoon in India. The dryness of the Transvaal spring excludes a large number of leaf-shedding trees that would otherwise flourish in the Transvaal. Such trees being leafless in winter, do not feel the winter drought, but when they burst into vegetative activity with the early Transvaal spring, the soil is bound in five months' drought, and the tender young leaves are liable to wither and fall. Thus it has been remarked that the common Horse Chestnut (*Æsculus hippocastanum*) comes into leaf twice—in spring and again with the summer rains. The tree suffers a complete loss of its spring growth ; it languishes and dies in a few years.

Along the eastern edge of the plateau there are mists and light rains in spring, which have a wonderful effect on vegetation, and make it possible to grow successfully a whole class of trees which fail elsewhere in the Transvaal.

SUMMER.

This is usually a season of abundant rain, but even on the eastern side there is considerable irregularity. A strong Trade-wind without storms may blow across the eastern districts without depositing its moisture, a weak stormy Trade-wind may deposit all its moisture in the eastern districts, and leave the western districts as dry as a desert, for months together. A good Trade-wind with regular alternations of calms and storms, seem to be the factors in a good season. A deficient Trade-wind or a too-persistent Trade-wind seem to be the factors in a bad season. The great South-east air current which, drawn by the northern sun, waters the whole of Japan and Southern Asia from May to September, is drawn by the southern sun over Africa from November to April. The variations and perturbations in this great air current are probably similar over Asia and over Africa. So far as we are yet able to judge, there is a direct connection between the rainfall of the Indian monsoon and rainfall in the Transvaal. There is every reason to believe that we shall be able to forecast the general character of each and to discount their effect on agricultural operations.

The Transvaal rains usually set in definitely in November, are at their maximum in February, and last with breaks till April. As in Mexico, the bulk of the Transvaal rain falls in the form of afternoon thunder-showers.

AUTUMN.

Autumn and early winter, with the tropical sting gone from the retreating sun, and ample stores of moisture in the soil, constitute a calm, beautiful season, the pleasantest time of the year in the Transvaal.

WIND.

Winds in the Transvaal are light, particularly to those accustomed to Cape winds. It is seldom that the velocity of the wind reaches thirty-five miles an hour. (Met. Dept.)

SEASON FOR PLANTING.

Leaf-shedding trees must naturally be planted when the leaves are off and vegetation dormant in winter. Such trees are generally fruit trees for which artificial watering is provided. Where trees have to depend on the skies for their watering and are evergreen, as are most of the timber trees suited to the Transvaal, they should not be planted till the rains set in steadily. Then with the ground wet and the sky cloudy, planting is as safe as during winter in winter-rainfall countries.

RADIATION.

Radiation is a factor which, on a dry elevated plateau like the Transvaal and in that latitude, cannot be neglected. Grown-up trees protect themselves to a great extent, but young trees and all nursery stuff must be guarded against radiation during winter, when there is the alternation, so trying to vegetation, of a scorching sun by day and sharp frosts by night. The Transvaal is particularly a country in which nursery work should be conducted under a protection of lathing. (See below under nurseries.) The lathing or lattice work here takes the place of the vapour which checks radiation nearer the coast. It is worth noting that in the celebrated Jardin d'Acclimatation at Algiers, where radiation is considerably less active than in the Transvaal, there are lath houses extending over an enormous area. It is mentioned that as much as 40,000 sqr. metres (say eight acres) of lath house was destroyed in one storm a few years ago.

SOME TRANSVAAL ELEVATIONS OF FOREST INTEREST.

	Feet.	
Wolkburg, near Haenertberg ...	7,400	above sea level
Snelkop—Woodbush Mountains...	6,700	,, ,, ,,
Belfast ...	6,452	,, ,, ,,
Indigenous Yellowwood Forest at Woodbush	4,000 to 6,000 feet	,, ,, ,,
Government Observatory, Johannesburg	5,960	,, ,, ,,
Hillbrow, Johannesburg	5,780	,, ,, ,,
Joubert Park, Johannesburg	5,750	,, ,, ,,
Pan ...	5,537	,, ,, ,,
Machadodorp ...	5,280	,, ,, ,,
Lake Chrissie ...	5,200	,, ,, ,,

	Feet.	
Vlakfontein	5,200	above sea level
Waterval Boven	4,880	,, ,, ,,
Irene	4,800	,, ,, ,,
Government Buildings, Pretoria	4,410	,, ,, ,,
Skinner's Court Nursery	4,400	,, ,, ,,
Klerksdorp	4,350	,, ,, ,,
Lichtenburg	4,300	,, ,, ,,
Pietersburg	4,275	,, ,, ,,
Waterval Onder	4,150	,, ,, ,,
Amsterdam	4,100	,, ,, ,,
Lydenburg	4,100	,, ,, ,,
Pilgrim's Rest	4,100	,, ,, ,,
Embabaan (Swaziland)	4,050	,, ,, ,,
Haenertsburg	4,500 ?	,, ,, ,,
Sabie	3,900	,, ,, ,,
Rustenburg	3,690	,, ,, ,,
Barberton	2,920	,, ,, ,,
Limpopo River at the Tropic	2,450	,, ,, ,,
Nelspruit	2,350	,, ,, ,,
Komatie Poort	620	,, ,, ,,

NATURAL ENEMIES OF THE FRUIT FLY.

Report on Investigations in Brazil.

By Chas. P. Lounsbury, Government Entomologist.

Reason for Investigation.

This report deals with an investigation of fruit flies and fruit-fly parasites in Brazil, and attempts to introduce the most abundant parasite into South Africa, made during the early part of the present year by Mr. Claude Fuller, the Natal Government Entomologist, and by the writer.

The need for the work undertaken was explained in an article, under the same major heading as this report, which appeared in the January issue of the Cape *Agricultural Journal.* The main facts are that Mr. George Compere, the Government Entomologist of Western Australia, had in the previous season visited Brazil in quest of natural enemies of the Fruit Fly, *Ceratitis capitata,* and had reported (*Journal of Agriculture,* Western Australia, August, 1904) that he found this fruit fly in that country and a number of other species of fruit flies, but all these insects were there held in check by several species of parasites and a certain Staphylinid beetle. In concluding his report he said: "In Brazil, the same as in India, Nature's forces of controlling these destructive flies is complete"; and further: "Once these parasites and beetles become established in the State (*i.e.* Western Australia), there will then be no more fear of *Ceratitis capitata* than there is of the most harmless insect in the country."

It should be explained that Mr. Compere is a self-trained entomologist, who, unlike most entomologists including myself, implicitly believes in the fascinating theory that when an insect is pestiferous year after year, it is owing to the local absence of enemies that prey upon it in its original habitat; and that man has only to find the proper natural enemies and succeed in establishing them where an injurious insect occurs to effect the speedy suppression of the latter.

The most notable instance of the suppression of a pest insect by the restoration of a natural enemy is that of the Australian Bug, *Icerya purchasi,* which from a condition of remarkable abundance speedily disappeared from notice on the introduction of the Vedalia ladybird into South Africa about fifteen years ago; and men like

Mr. Compere believe that as complete natural subjugation of any insect pest may be achieved. The writer's impression of Mr. Compere gathered from an acquaintance with his work and writings for a number of years, is that he is an excellent collector and keen observer of insects; and allowing most liberally for excessive optimism on Mr. Compere's part, it seemed to the Natal Entomologist and myself that the chance that the fruit fly enemies observed by him in Brazil would prove of value in South Africa justified and demanded immediate steps for their introduction.

In correspondence on the subject, Mr. Fuller suggested that as all the South African Colonies suffered from the depredations of fruit flies, the introduction of enemies from abroad was one in which all were interested, and therefore that there was an opportunity for joint action. The writer then prepared an official memorandum asking the Cape Government to take action and to invite the other Colonies to bear portion of the expenses. The Transvaal Government Entomologist, Mr. C. B. Simpson, thought that any action in the matter was inadvisable until Mr. Compere had demonstrated the success of his checks in Western Australia; but Mr. Fuller and I opposed any delay on the ground that the experience of a number of years might be required to determine the value of the checks in Western Australia, and that partial or complete failure there might not satisfy us that a satisfactory degree of success would not crown efforts to establish the checks here, whilst the benefits that would be derived in a single season should Mr. Compere's expectations be fulfilled would outweigh all the expenses of the introduction. Moreover, it was desirable that Mr. Compere's statements on Brazilian conditions as regards the pest be checked by the observations of other entomologists. The Cape Government consented to my visiting Brazil for the purposes in view and appropriated £500 for the mission. Natal agreed to let Mr. Fuller go and to expend up to £375. The Transvaal at first declined to co-operate owing to Mr. Simpson's unfavourable views, but later agreed to contribute up to £300. The Orange River Colony pledged £125, which amount was the proportion of the estimated expenditure I deemed its reasonable share.

The object of having two entomologists go was to increase the chances of success. Owing to the greater prevalence of fruit flies in Natal than elsewhere in South Africa, it was deemed advisable that the initial introduction should be made to that colony. It was planned that the Natal Entomologist accompany the writer to Brazil, spend a few weeks there and then return to South Africa, with such supplies of the insects as could be obtained during his stay, and equipped with a knowledge of the conditions under which the insects lived in their native home that would enable him to treat them to best advantage in South Africa. The writer planned to remain longer in order to investigate the subject more exhaustively and to obtain and forward further supplies of the insects. Moreover the consideration that Mr. Campere deemed the Staphylinid of even greater value than the parasites in suppressing fruit flies, and that he found it necessary to provide the specimens of this beetle which he succeeded in getting alive to Australia with daily supplies of fly maggots, made it appear advisable to have two entomologists go, thus to double the chances of getting ample numbers of this check alive to South Africa.

There is no need to dwell at length on the importance of fruit flies (*Trypetidæ*) as pests. The Cape Fruit Fly is a species of unknown origin which now occurs as a highly pestiferous insect in the south of Europe and the north of Africa, in the Atlantic islands to the west of these parts, in the Bermuda Islands, in Mauritius, in parts of Australia, in South Africa, and, it may now be added, in parts of South America. In some places, as in parts of Natal, a peach seldom matures without becoming the home of its loathsome maggots; in other places, as the western districts of the Cape, most of the peaches usually escape attack. The peach is only one of numerous kinds of fruit that are subject to infestation, but is the one most uniformly affected and to which the injury inflicted is most destructive. One of the most popular names for the pest is "Peach Maggot". The extent to which fruit is destroyed in the Mediterranean region is not generally known, and the following quotation out of a private letter from Mr. F. T. Bioletti may therefore be of interest. Mr. Bioletti until recently was horticulturist at the Elsenburg Agricultural College, and when he wrote in December last, he had just completed a tour through French and Algerian fruit districts. He said: "Algeria ought to be a good place for fruit growing but the fruit fly makes it impossible to grow any but the earliest varieties and these only in a few localities."

The discovery of efficient parasites for this cosmopolitan and destructive pest would be a matter of very great importance to the fruit-growing world, and the statements which Mr. Compere made relative to the existence of natural enemies and the exemption of most fruit from attack in Brazil, were therefore of extreme interest; and, coming from a skilled collector who had been patiently seeking for years in country after country for such conditions, I deemed them worthy of close investigation.

OUTLINE OF INVESTIGATIONS.

Mr. Fuller and I left Cape Town on January 4th and arrived at Bahia, Brazil on January 28th. We journeyed via Madeira at which islands all the U.C.S.S.Co's. Cape mail steamers, and one outward and one homeward each month of the R.M.S.Co's. South American mail steamers, regularly call. Bahia was made our base of operations because it was here that Mr. Compere had chiefly collected. Mr. Fuller remained five weeks and then returned to Natal via England with some material we had meanwhile found. I remained with him a fortnight and took the next mail steamer down the coast to visit the Sao Paulo districts; and at the end of five weeks reached Bahia again on the steamer on which Mr. Fuller left. After two more weeks in and about Bahia, I left for Rio de Janeiro; and, after a week, March 22nd to the 29th, in and about this port, I continued down the coast to Buenos Ayres. At this last place I spent April 2nd to April 14th and then left for Cape Town by a direct boat. The voyage across usually occupies fifteen to eighteen days. The service is an irregular one of steamers of several lines engaged carrying frozen meat, livestock, lucerne hay, and butter to South African ports; and no dependence can be placed on the dates advertised for departure. I had to wait a week for my boat; and was delayed a fortnight more on the way through the occurrence of a serious fire in the coal bunkers which necessitated a return to Montevideo for assistance. The return, however, gave me an opportunity to make enquiries on the subject ot investigation in Uruguay. Cape Town was reached on May 13th.

Mr. Compere arrived at Bahia wholly unexpected by me on the very day I left the city. Had I known of his coming a few hours before I did, I would have postponed my departure; but as things happened, I was able to get only an hour's conversation with him. He had come via New York from California, to which state he had taken Codling Moth parasites from Spain. His mission in Brazil was to secure further supplies of the fruit fly natural enemies for Western Australia. The specimens which he had introduced last year had apparently all, or nearly all, perished without having propagated. This failure to establish them was a surprise to no one, as, owing to the short notice of their discovery, suitable preparation for their reception had been impracticable. Somewhat elaborate arrangements for the care and breeding of those that were to be secured the present season were promised; and Mr. Compere was still confident that if the initial difficulties of colonisation were successfully mastered, the Fruit Fly would soon cease to be regarded as a pest in his country.

The method of investigation pursued by Mr. Compere was very different from the one adopted by Mr. Fuller and myself. Mr. Compere, we gathered from our enquiries and numerous circumstances, spent practically his whole time collecting the insects he was in seach of and in studying their habits. The statements in his report, regarding the efficiency of the natural enmies of the fruit flies, are based almost entirely on the evidence of his own observations during the short period, about one month, that he spent in the country. As far as we could learn he did not look for commerical fruit orchards but collected chiefly in more easily accessible gardens in the residential sections of the cities he visited. The only official to whom he applied for information appears to have been Dr. H. von Ihring, the Director of the Sao Paulo museum, and Dr. von Ihring, I learned, was unable to give him much attention owing to very serious illness in his family at the time.

Our general plan of work, on the other hand, was to get introductions by the aid of our credentials and through the British and American Consuls to the officials of the agricultural departments and museums of the places visited; and, after ascertaining what was known concerning fruit flies to these Government authorities to secure acquaintance with the proprietors of the most extensive fruit gardens and orchards, and those merchants and others in the cities from whom it seemed probable that we might get information and assistance. We questioned and cross questioned every likely party we met on the subject of fruit pests, carefully observed the conditions in every garden and orchard we visited, and kept a close watch for maggots in the fruit sold in the markets and streets. By his plan, Mr. Compere was able to work early and late in the field. By ours, much time was consumed in interviews with men whom we found to have no new information to give us, by journeys to and from distant orchards, and in other unproductive ways. But we are convinced that by our means we got a truer idea of the actual conditions than could possibly be obtained by the most painstaking personal observation extending over a limited period of time.

Since Mr. Fuller and myself worked very little together, it seemed to us better to write separate reports than a joint one. His report is published in the *Natal Agricultural Journal* for May 26th, 1905.

CONDITIONS AT BAHIA.

We arrived at Bahia, January 28th. Mr. Fuller remained until March 4th; and I was there until February 10th and again March 4th to March 19th. The city is in latitude 13° S, which is several degrees nearer the Equator than Mozambique, in Africa. It is situated on a peninsula and, excepting one trip made by Mr. Fuller to an island lying a few hours' sail distant, our excursions were confined to this peninsula and to within ten miles of the centre of the town. Even in mid-winter the temperature ranges between 70° and 80° with a mean, in August, of 75°. The average annual rainfall is 70 inches and the average relative humidity 83°. Rain falls on an average of 125 days, and in few years does less than an inch fall in any one month. April, May, June, and July are the wettest months, one-half of the precipitation occuring then. November, December, and January are the driest; yet even then the average fall is nearly three inches a month. These facts shew the climate to be decidedly tropical and comparable with no part of British South Africa unless it be the narrow coastal belt of Natal. Little English is used in the country. Portuguese is the national language, and most of the educated people speak French fluently; this holds true throughout Brazil.

Bahia, Compere states, is recognised as "the fruit garden of Brazil". We found little to justify the title if it is intended to convey the idea that much fruit is commercially grown or that fruit is a common article of food. Bananas are grown in quantities, it is true, but not in an abundance to excite comment. Oranges are commercially grown, yet few proprietors own over a thousand trees, and the prices at which the fruit is sold make it an article of luxury for the great mass of people. Many of the bananas and citrous fruits, and practically all the other fruits, "grow themselves" in gardens, back yards, as shade trees about residences, in grass lands, in fact here, there and everywhere in limited numbers. There is no fruit market worthy of the name; and excepting oranges, bananas, and pine apples, the quality of the fruit offered by the dealers is decidedly inferior, and is no incentive to its consumption amongst the better class of residents. I did not find what I could call a decent fruit shop anywhere in this dirty, antiquated city of nearly 200,000 people. Most of the fruit is sold by coloured women on the street, from doorways, or from the passages of their filthy hovels, and is brought to town and carried about by these people chiefly in broad baskets adroitly balanced on their, perhaps none too clean, heads.

Our visit was not timed as well as it might have been. We supposed February to be the great fruit month as it is in South Africa; but we soon learned that at Bahia fruit is an all-the-year-round product with the periods of greatest abundance in December and May. However, we found ripe specimens of a variety of kinds, and probably learned as much about the objects of our mission as we could have done at any other time of the year.

The fruits that came to our notice were the banana, orange, lime, sweet lemon (the true lemon is not grown), pineapple, mango, paw-paw, red, white, areça mirim and other guavas (*Psidium* spp.), fruta de conda and penha (*Anona* spp.), pitanga (*Eugenia michelii*), pitomba (*Phyllocalyx* or *Eugenia luschnatianus*), caju (*Anacardium occidentale*), sapote (*Sapota achras*) genipapo (*Genipa americana*), umbu (*Spondias tuberosa*), mangaba (*Haucornia speciosa*), caja (*Spondias lutea*), avocado or alligator pear (*Persea gratissima*), jaboticaba (*Myrtus jaboticaba*), jaca (*Artocarpus integrifolia*) and bread fruit (*Artocarpus incisa*). All these that are followed by their botanical names, with the exception of the last two, are native to the country; and of them all, the bananas, citrous fruits and pineapple are the only ones we saw growing in plantation form. The pitanga tree is chiefly grown in hedges. The pitomba is similar and grows to about the same height but is much less common. All the fruits listed after these grow on rather high trees; and their examination for our purposes was practically confined to fallen specimens and to such as appeared in the streets for sale.

The climate is too tropical for apples, pears, peaches, and plums; and the very few trees of these sorts that we saw were miserable specimens which produced little or no fruit.

The Acting British Consul, Mr. F. Stevenson, and the American Consul, Dr. H. W. Furniss, gave us much valuable assistance. Mr. Stevenson permitted the consular clerk, Mr. H. J. Moon, to accompany us for a few days to introduce us to proprietors of orchards and to interpret; and Mr. Furniss, a naturalist himself, personally attended us on several occasions and later secured for us a young man, Mr. Joseph Donald, as an interpreter for the remainder of our visit. Dr. Miguel Calmon du Pin e Almeida, the Secretary for Agriculture, received us kindly, gave us the use of a room, and of such glass ware as we needed, at the state bacteriological station; and assigned an assistant, Senhor Joaquim Bahiana, to introduce us to the principal orange growers and others, and to generally assist us in our investigations. To all mentioned I am very thankful for their assistance.

None of the gentlemen named had heard of Mr. Compere's visit to Brazil, and none had any exact knowledge of fruit flies; but all of them and, without exception, all the people we met who grew any fruit knew of maggots in fruit. Pitangas it was stated, were almost invariably infested, and guavas very commonly, particularly a small variety (or rather species) called "areça mirim". Most of those whom we questioned knew of the common occurrence of maggots in cajus and sapotes. Dr. Calmon said that maggots ocurred in mangoes but not commonly, and that he had seen none in the few peaches that grew in the town of Bahia. In the high interior of the state, he said, that peach trees were common and that maggots destroyed most of the fruit; and further that the same pest was well known in quinces in the parts of the state where this fruit grew.

Our observations abundantly bore out the common assertion that the pitanga is much infested. This fruit, the Brazilian cherry of Natal, grows on a shrub-like tree. It is a soft, juicy, red-skinned, red-fleshed, thin-skinned, large-stone fruit, which grows to be from half an inch to an inch in diameter. It generally ripens in December, but in common with many other tropical fruits, ripe specimens are to be collected at any time in the year. We found a limited number and over half the fully ripe ones we opened proved to be infested, generally with only one maggot, but sometimes with two and rarely with three. The maggots are not always easy to find, and my impression is that nearly every fruit gets punctured if allowed to fully ripen on the plant. The fruit decays very quickly and doubtless a great many eggs and small larvæ never get time to develop. Mr. Fuller counted 280 puparia from one lot of pitangas that we gathered; and from them emerged 124 fruit fly adults and 77 parasites. From another lot collected on March 11th in the same locality, I obtained 141 puparia; and from these emerged 47 flies and 28 parasites. The latter lot consisted of 221 fruits, large and small, ripe and unripe, shaken from the bushes. The extent of parasitism in both these cases works out at about thirty-eight per cent.

The guavas were ripening very unevenly and no great number of trees were found. Nearly all the fruits that were soft, however, proved to contain maggots though often very small ones. Thirty fruits, some white fleshed and some red, which were shaken from trees on March 11th, were kept under observation. . From superficial examination at the time they were obtained, only about one in three of other ripe fruits from the same trees appeared infested; but after ten days it was found that twenty-eight of the thirty put aside contained maggots. The puparia obtained were not counted, but despite a very heavy mortality there emerged 69 flies and five parasites. In this case then the extent of effective parasitism was less than eight per cent. A number of distinct species of the guava genus grow about Bahia and the fruit of all is subject to severe attack by the fruit flies. The only kinds which I saw appear for sale were the ordinary red flesh and white flesh guavas and the "areça mirim." The latter is generally under an inch in diameter and in appearance, inside and out, reminds one of the Cape gooseberry. On leaving Bahia, I brought the few I could find, in all perhaps twenty pounds, and kept them by me until they decayed. By count of several hundreds, about forty per cent. were maggot-infested; unfortunately, the majority of the maggots were dead in the fruit. No doubt they were killed by the fruit having become heated by the sun when being brought to town. This fruit, like much of all the other kinds, is most commonly brought in wide, shallow baskets carried on the head. The true guavas and the areça mirims are very much pested by the grubs of some coleopteron; very commonly beetle grubs and fly maggots are found together in the fruit, and between the two pests few of the fruits escape attack. The fruits are used for food, notwithstanding; the finishing course of a Brazilian meal amongst the better classes commonly includes "guava cheese," a confection of cheese-like consistency made from guavas in the preparation of which the seeds are strained out.

The sapote was not in season. This is a russet-coloured fruit, the size and shape of an egg, that grows on a tall, handsome tree. The odd fruits found under trees were generally maggoty, and I was again and again told that maggoty fruit was the rule. Only a few of the fruits exposed for sale were infested, but probably these fruits were picked when very immature. The very ripest were often infested. The caju, too, was only beginning to ripen when I left. The tree in its size and fruit may be likened to the Cape Kafir plum tree (*Harpephyllum caffrum*). The fruit is yellow, about the shape and size of the Kafir plum and with even less flesh about the large stone. Several parties told me maggots were very commonly found in it. Mr. Fuller succeeded in getting some fruits in the market and out of puparia he obtained from these which he left with me, there emerged twelve fruit flies and one parasite. Only two pitomba trees were found in fruit. The fruit is yellow and the size of a small plum; almost every specimen I examined was infested by a maggot. The umbu is a pale soft fruit about the size of a date. We did not see any bearing tree, but Mr. Fuller was presented with a few fruits, to eat, that came from a distance. He kept some of these until they became fully ripe and was rewarded by finding them maggot infested; he ultimately obtained both fruit flies and parasites.

The oranges grown are almost exclusively of the famous navel variety. Sound fruits were not fully coloured during our visit, but numerous green ones were being sold. On the ground beneath the trees many fully coloured damaged ones were found, and here and there was an injured and prematurely ripe one on the trees. A small proportion of these contained maggots which at first I thought were true fruit fly larvae, though of a species distinct from those in the other fruits examined; but which I later concluded were larvæ of some fly which oviposits only after decay has started. Larvæ of the same kind were found in sweet lemons and limes, though infrequently.

A large number of mangoes were examined, but in no case was any fruit fly larvæ found in one. Nor were any maggots found in alligator pears, many fully ripe ones of which were examined; and mangabas and cajas, of both of which many ripe specimens were found, likewise appeared to be free from the pest. Little attention was paid to bananas, paw-paws, jacas and bread fruits, but no trace of maggot injury was found in any of the fruits of these kinds that came under my notice, and no suspicion that they suffered was known to any of the parties of whom I made inquiries. An inferior kind of custard apple called "fruta de conda" was found to contain lepidopterous larvæ, but in none of the comparatively few specimens examined were fruit fly larvæ seen. When I was away from Bahia, however, Mr. Fuller found infested custard apples of some sort.

The fruit flies reared from pitangas, pitombas, guavas of all kinds, cajas, umbus, and custard apples are all of a single species, *Anastrepha fraterculu.* Those reared from sapotes by me were all of a related species, *Anastrepha serpentina* Other species were noticed on the wing, but were not bred from fruits; *Ceratitis capitata,* however, was not amongst them and during our stay at Bahia neither Mr. Fuller nor I saw a single specimen of this species. Mr. Compere reports it to occur there and in conversation he told me that he had both seen it on the wing and reared it. I presume that it must be uncommon, but would attribute its rarity not to the presence of natural enemies, but to the absence of most of the fruits specially attacked by it or to other causes. Of all the kinds of fruits found at Bahia, I have reared *Ceratitis capitata* in South Africa only from oranges and guavas; oranges are attacked to a very slight extent only unless they are permitted to hang on the trees long after ripening, and guavas are even less attacked. Personally I have seen the pest in one kind of guava only, and that an uncommon small, purple sort that grows on a low tree; even in Cape Town gardens where most of the late peaches are generally lost from maggots, the common red, and white-fleshed commercial guavas appear to entirely escape.

All the parasites reared were in company with *Anastrepha fratercula.* They are all Braconids and most if not all of one species which Mr. W. H. Ashmead considers with very little doubt *Opiellus trimaculatus* Spin. The names of the flies given are from determinations by Mr. D. W. Coquillett. To these gentlemen at the United States National Museum, the specimens were submitted through the kindness of Dr. L. O. Howard, the Entomologist of the United States Department of Agriculture. I saw parasites resting or walking about fruit on six or eight occasions, but I made no exact observations on their methods of work though I thrice caught sight of females with their ovipositors inserted in what proved to be maggot-infested fruit. Parasitised maggots leave the fruit and pupate as do healthy maggots; but when the puparium shell ruptures, there emerges a parasite instead of a fly. The first emergences from a parasitised lot of puparia are of male parasites; then after one or two days female parasites begin to appear, and at the same time or a little later the first of the flies. I may mention that we observed small seed-infesting wasps, and what we think were parasites on the same, in both guavas and pitangas; when we first saw these insects ovipositing and running over fruits we not unnaturally mistook them for fruit fly parasites.

Much to our surprise, because of Mr. Compere's report, we rarely saw a Staphylinid beetle in any fruit. A few specimens of a small species were found in oranges, but these did not appear to be seeking fruit fly larvæ; and later when I met Mr. Compere I learned that his species is a much larger one. And I may as well mention here as elsewhere that I also failed to find the right species about Sao Paulo and at the other places visited. Mr. Fuller and I both looked specially for it up to the time of his leaving, and I am positive that if it was present at all in fallen fruit it must have been very scarce; besides plenty of maggots of one kind and another were found in fruit on the ground and no indication of anything actively preying upon them. During the last week I spent at Bahia, I paid no attention to fallen fruit, for one reason because by that time I had concluded that the beetle could not be an important factor in fruit fly suppression and for a supplementary one because I had then arranged to continue the investigations in more southern places and would be unable to care for any live beetles should I find the right kind. My final search was made in orange orchards about ten days before I came away and just prior to deciding on my plans and it convinced me that the beetle must be a check which for some reason or other only appears late in the Bahia season. Whilst in the Argentine a month later, I considered the idea of returning to Bahia, so as to be there at the time of year when Mr. Compere was successful, but the apparent hopelessness of a check, which failed to work during the summer months when the pest is rampant, being of any use in South Africa decided me that the expense in time and money of a return visit to Brazil would not be justified.

Mr. Compere, as already stated, arrived at Bahia the day I left; and since my return to the Cape, I have heard from Dr. Furniss, the American Consul, that he succeeded in collecting several hundreds of the beetles in one orange grove during the following week. That the beetles had become common and easy to find in and about fallen fruit was confirmed by Dr. Furniss. Though surprised that this occurred so quickly, I believe the explanation to be connected with the abundant rains that had begun to fall. Rain fell every day during the last twelve days of my stay and the effect on the ripening oranges was very marked. They began to decay and to drop in great numbers and to become infested by various decay insects. Other fruits too began to drop heavily. The Bahia orange is particularly subject to decay owing to moisture collecting in the navel-like formation at its lower end; the mischief usually starts within or close by this part of the fruit. I remarked on the excessive dropping of the oranges to Mr. Compere and learned from him that the same condition prevailed at the time of his previous visit; there were often as many oranges lying on the ground as remained on the tree, he said. The orange grove where he collected beetles after my departure was planted to a heavy, tall-growing forage grass which was cut just before he came; and it is possible that there was some connection between the grass and the occurrence of the beetle in the fallen fruit. No secondary crop was grown in the orange groves in which I last looked, and the growth of the weeds was very scanty owing to cultivation.

(*To be Continued.*)

ANIMAL CASTRATION (The Horse).

By W. Robertson, M.R.C.V.S., Bacteriologist to the Department of Agriculture.

Castration,—the destruction or removal of the essential organs of generation—is, perhaps, the commonest operation in the domain of Veterinary Surgery which the farmer or stock owner is called upon to perform. It is not nearly so often resorted to for pure surgical reasons as for purposes closely allied to questions of agricultural and industrial economy, by reason of its effect upon the individuals of the various species of animals subjected to it, in order to improve their value and increase their usefulness to mankind. This is no new discovery. As far back as seven centuries preceding the Christian era, it was known and practised upon animals, and the various Greek and Roman writers upon the subject give details of the method of carrying out the operation. The operation may be regarded under two heads, considered as one of necessity when diseased conditions of the testicles or appendages render the removal of that organ necessary; or it may be resorted to for reasons of mere fashion and convenience, and has for its object the rendering of the animal *more suitable for the service of man.* It is the operation as performed under this general heading that we shall consider, and in entering into the details of the various methods, the horse is naturally the first of our domestic animals to be considered.

Before entering into a detailed description of the operation, we will rapidly pass in review the anatomical structure of the region of the flank and the testicles. The testicles (two in number) are enclosed in the scrotum, which is a continuation of the skin, and forms a complete bag common to both. The scrotum consists of the external skin and several layers of tissue; some fibrous, others vascular. The testicles thus covered by an inner serous membrane are suspended at the end of the spermatic cord formed anteriorly by the spermatic artery, a band of muscular and fibrous tissue, and the duct which carries the male fertilising fluid (semen) from the testicles to the ducts in the wall of the penis.

AGE FOR CASTRATION.

A colt *can* be castrated as soon as the testicles appear in the scrotum, but it is unwise to do so until the animal has attained approximately his full height. At what age this occurs differs in different situations and with the conditions under which the animal is reared and nourished. In Britain, most parts of Europe and America, a period between eighteen months and two years is generally preferred; in this Colony the animal is generally over two years before the operation is deemed advisable.

CONDITION FAVOURABLE TO SUCCESSFUL CASTRATION.

The young horse suffers less from castration than the old, and very rarely perishes. Good health in the subject is all important. Always carefully examine a colt before casting to castrate; see that both testicles are down, and particularly notice if the animal is ruptured, *i e.* if some of the gut has not passed from the abdomen into the scrotum by the side of the cord. In such case, if castration is imperative, a special method must be resorted to; this also applies to cryptorchids or rigs, which have only one or none of the testicles in the scrotum, and have to be operated on in the special method described. I have seen a colt cast and castrated, and on rising, the bowels descended through the opening in the scrotum to the animal's hocks, an accident which might have been prevented by careful examination. Castration should never be attempted during the prevalence of strangles (nieuwe ziekte), pneumonia, influenza, &c.

Warm weather is to be preferred to cold and wet; in the Colony the Spring season is the most suitable, the weather is then mild, and the flies not unduly troublesome.

PREPARATION BEFORE OPERATION.

A low diet for twenty-four hours preceding the operation, an empty stomach at the time of castration, and a thorough washing of the skin of the sheath and surrounding parts are precautions no operator should neglect. If the animal is stabled, give nothing but bran mash and water the day before the operation, and no food or water the morning of the operation. It is almost impossible to cast a horse safely if the stomach is distended with food. If the animal is an aged, gross, or very fat subject, I recommend that he have a bottle of Raw Linseed Oil or a physic ball twenty-four hours before the operation.

RESTRAINT.

In this country horses are usually cast and tied by a long rope or reim, and the method which is well-known to all owners of horses may be briefly described. (See illustration). A thirty or forty foot

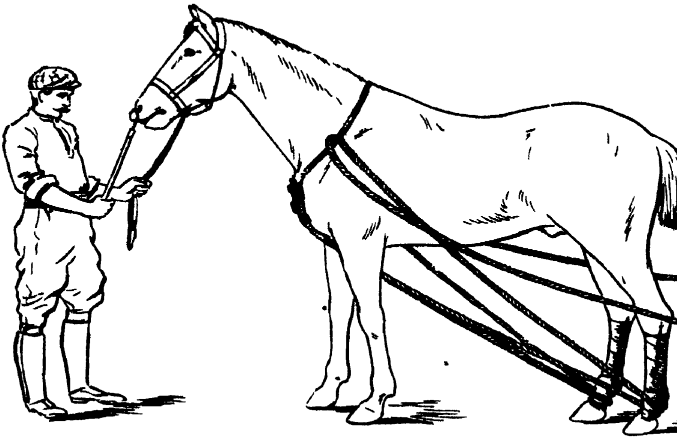


Fig 1

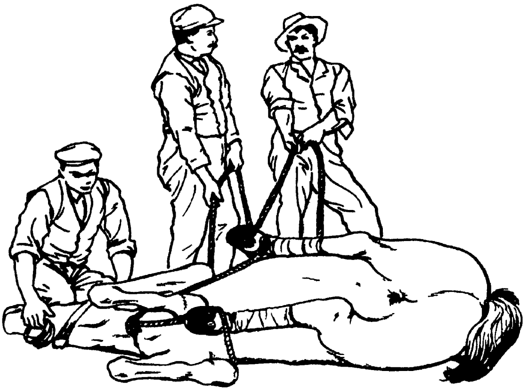


Fig 2

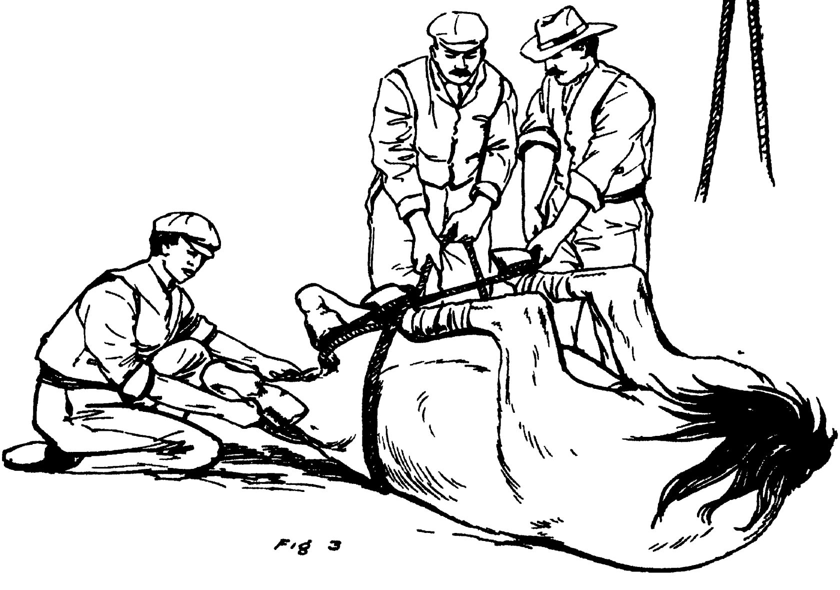


Fig 3

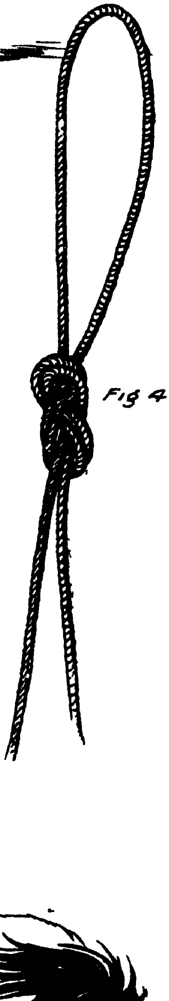


Fig 4

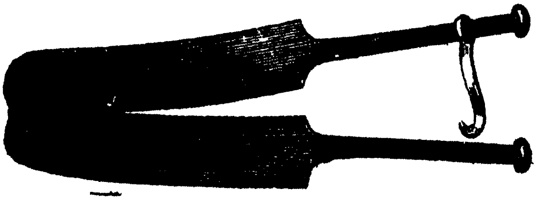


Fig. 5.

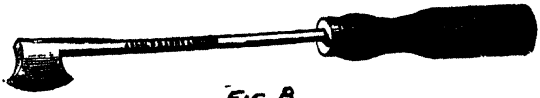


Fig. 8

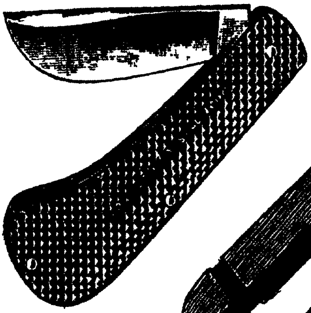


Fig. 4.

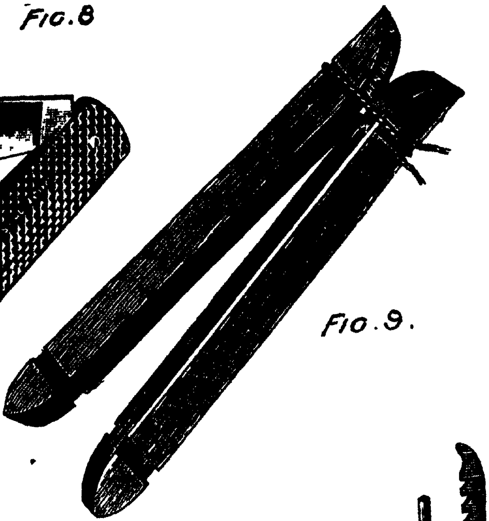


Fig. 9.

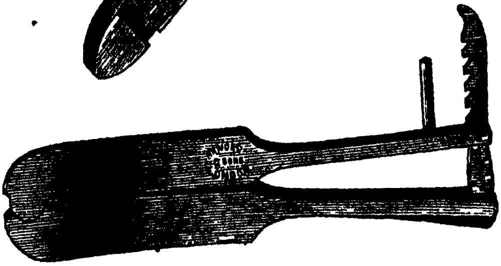


Fig. 7.

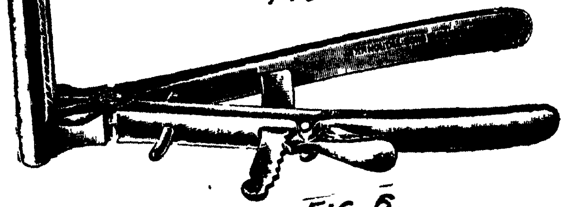


Fig. 6.

reim is doubled, and a flat knot tied on the doubled end about three feet from the extremity, thus forming a loop which is slipped over the horse's head and fastened by a piece of string to the mane or a surcingle around the horse's middle. The two ends are passed between the fore legs (the knot resting over the point of the breast bone), and then between the hind, and parted, a reim being brought up outside the flanks of the horse and through the loop around the neck. (See figure 1.) The bight of the reims are shaken down into the fetlocks, and two or three men pull on each reim, bringing the animal's hind legs up to the shoulders, where they are fastened with a few half hitches. (See figs. 2 and 3.) In addition to the men at the ropes, a *good man must be stationed at the animal's head in charge of the bridle and twitch* with strict orders that he must keep the horse's head extended the moment the animal is cast.)

The horse is then rolled on his back, propped there by bundles of forage or supported by men, is ready for the operator, who must provide himself with:— A bucket of water, a piece of soap, a clean towel, and some disinfectant (Jeyes', Little's Dip, etc.,) and such instruments as are required by the method of castration he intends to adopt.

In all cases it is good policy to draw the penis and wash that organ and the sheath and scrotum thoroughly with soap and water, followed by disinfectant and water—a tablespoonful to the quart.

METHODS OF CASTRATION.

The more common methods of performing this operation are by

(1) Simple excision.
(2) Scraping.
(3) Torsion.
(4) Crushing.
(5) Firing, or by the hot iron.
(6) By clamps.
(7) By ligature.

Simple Excision.—This is claimed—and no doubt with truth—to be the oldest method, and simply consists in opening the scrotum, pulling the testicle gently out, and severing the cord with a clean cut. The objection to this method in the case of horses is the amount of bleeding which generally supervenes.

Scraping.—This is a modification of above. Instead of using a sharp-edged instrument to divide the cord, the operator employs a dull knife with which the coats of the artery and portions of the cord are scraped until separation takes place. This operation requires a slow and steady hand, the testicle is removed from the scrotum, the muscle at the side of the cord divided, and the artery and vein slowly scraped through. This is a safer method than the former, but is not applicable or recommended in the case of fat or aged horses, as severe bleeding may supervene in such animals.

Torsion.—In this method of castration the cord is twisted with sufficient force to cause it to break of itself at the point of the greatest violence. In this operation the employment of certain instruments is necessary, one to clamp the cord firm, the other to rotate it on itself. The instruments in addition to a sharp knife (fig. 4 is the proper shape of castrating knife) are two pairs of forceps (figs. 5 and 6).

The scrotum is opened in the usual way, the testicle removed and the clamps (Fig. 5) applied to the cord well above the testicle and fixed tight by the sliding hook. Forceps (Fig. 6) are now applied to the testicle side of the cord and gently twisted round, after about a dozen or fifteen revolutions the cord will gradually rupture. Clamps (Fig. 5) can then be removed, the cord allowed to slip back into the scrotum and the other testicle dealt with. It is important in this operation to warn the assistant holding clamps (Fig. No. 5) against pulling on the cord during the struggles of the animal (consequent upon the pain caused by the first application of the instruments), but to keep the clamps close up to the scrotum.

This method of castrating is one of the most rapid of all the forms and is much in favour with many veterinaries and stockmen.

Firing, or By the Hot Iron.—This is claimed to be one of the oldest modes of operating. Vegitus and Alysartus describe it as a very common method of castrating the horse. The instruments essentially necessary for operation by this method are (in addition to the knife) first a peculiar pair of forceps or clamps for holding the cord (Fig. 7) and securing it while the application of the hot iron is being made; and the second, the iron or cautery itself (Fig. 8). These clamps are of metal and provided with a spring rack. There are many modifications of this instrument as regards shape, size and means of clasping, but the essential principle is the same, and I prefer the spring rack.

The animal being cast, and the sheath, scrotum and surrounding parts well washed—first with soap and water, followed by disinfectant solution and well dried—the scrotum is opened one side at a time by a free cut with a sharp knife in an antero-posterior direction and towards the posterior part of the scrotum. The testicle will slip out and the cord well above the testicle is caught between the jaws of the clamps (which have been up to now lying in a bucket of disinfectant) and firmly secured, seeing that none of the skin of the scrotum gets between the jaws of the clamps. The horse will generally struggle as these are tightened, so care must be taken that no traction or pulling on the cord takes place.

Some operators sever the cord with a knife and use the hot iron as a searing instrument; others employ the sharp side of the iron to sever the cord and then apply the broad portion of the iron over the entire surface of the stump of the spermatic cord and cauterise or sear the part thoroughly. It must be remembered that to ensure the safety of the cauterization, the iron must be very hot, otherwise, when it is removed, if it has cooled off, it may adhere to the carbonised surface and the seal formed at the end of the blood vessel may accompany the instrument.

When the operation is completed the clamps should be opened with great care in order to ascertain whether all bleeding has ceased, and the cord may be allowed to retract. If any oozing of blood appear at the point of operation, the cauterization must be repeated at the point indicated. Personally, I find that working with clean fresh-filed irons and dipping them in a little lard previous to searing the cord will obviate any danger of the tissue sticking to the iron.

Some men employ the hot iron for all the details of the operation. After washing and drying, the scrotum is seized with the left hand and the testicle squeezed tight and evacuated with a sweep of the sharp edge of the hot iron and the other details carried out as usual.

This is the method I always advocate. There is less risk of bleeding or septic poisoning than in any other plan, and I think the trouble of heating the iron more than balanced by the safety and neatness of the operation.

The Irons, two are wanted—any smith can make them—and the clamps cost about 15s., post free, from any veterinary instrument maker. I have seen old Clydesdale and Shire stallions, which have been standing at stud for several seasons, castrated by the hot iron without bleeding; and where it has been introduced it has always proved popular with stock-owners.

Clamps.—This is an ancient mode of operation, having been handed down to us through many ages, and is highly thought of in America and India.

The instruments necessary to operate in this case are a sharp knife (blunt-pointed like fig. 4 preferred), a couple of pairs of clamps, some strong twine and a pair of blacksmith's or shoeing-smith's pinchers.

The clamps most commonly employed are two semi-cylindrical pieces of light, strong wood with flat surfaces and a groove at each end to receive the twine (fig. 9). These clamps are so formed to embrace the cord and to be firmly applied to it, in order to constrict the artery and prevent bleeding. Before being used they are tied together at the one end.

The animal having been thrown and the legs fastened and skin disinfected, the left spermatic cord just above the testicle is now seized in the left hand, so as to render the skin tense over the stone, and the right hand armed with the knife, makes an incision from before backwards, about three-fourths of an inch from and parallel to the median line between the thighs, deep enough to expose the testicle and long enough to allow that organ to start out through the skin. At the moment of making this incision the cord must be grasped very tight, otherwise the testicle may be drawn up out of reach. Then insert the knife through the cord, between the anterior and posterior portions, and the latter—the one which the muscle retracts—is cut completely through. The testicle will now hang limp, and the cord must be included between the flat surfaces of a pair of clamps and the open ends brought together with a pair of blacksmith's pinchers, and tied with a piece of strong waxed non-stretching twine. When the clamp is fixed the testicle is cut off one inch below it.

In from three to four days the clamps may be removed by dividing the string where it secures the ends of the clamps. If it retains the springiness it ought to have possossed at the time of its original application, the branches readily spring open and fall to the ground. Should the stump hang out of the wound, push it inside with the finger.

The Ligature.—This method of castration consists in the application of a circular ligature upon the entire cord, or a portion of it, for the purpose of completely closing the artery. It was in use so long ago as 1734. The ligature used in this method is formed of waxed silk, string, or fishing line. The only variation between this method and the one last is found in the fact that in this the testicle and cord being exposed as in ordinary castration, the ligature is applied either on the cord as a whole or its anterior part.

In this case the testicle is amputated immediately after the application of the ligature, taking care that the amputation does not take place too near the point where the constriction is made.

Some operators prefer to tie the spermatic artery only, using a needle and stout silk thread.

Bleeding after Castration.—Bleeding from the wound in the scrotum and from the little artery in the spermatic cord always occurs, and in warm weather may seem to run quite free. It scarcely ever lasts, however, over fifteen minutes, and is easily checked by dashing cold water against the part. If the bleeding from the cord is serious, the scrotum can be plugged with tow or cotton-wool, and fastened with a couple of stitches

Pain after castration.—Some horses are pained and very restless for some hours after castration, and this may extend to cramp of the bowels and violent colic. This is best kept in check by carefully rubbing the patient dry when he rises from the operation, and then leading him in hand for some time. If the pain persists, a dose of laudanum (1 to 2 ounces for an adult) may be given.

Swelling of the Sheath, Penis and Abdomen.—This occurs in unhealthy states of the system in bad seasons, and as the result of operating without adopting the necessary measures of cleanliness of the parts, hands or instruments, or it may result from premature closure of the wound and imprisonment of matter. Pure air and cleanliness of groin and wound are to be secured; antiseptics like Jeyes' Fluid, one part to thirty of warm water, are to be applied to the parts and the wound opened, if that is the originating factor.

The most tense or dependent parts of the swelling in sheath penis, or beneath the belly, should be pricked at intervals of three or four inches to a depth of half-an-inch and fomented with warm water.

In cases like above the penis may be imprisoned in the sheath (phymosis) or protruded and prevented from returning (paraphymosis).

Above treatment and scarification of the part will prove useful. As a preliminary procedure, bathing the penis, if protruded, with strong alum water and the application of an elastic bandage, will often press the blood from the organ, and allow the operator to return it.

Tumours on the Spermatic Cord.—These are due to rough handling and drawing upon the cord in castration. They give rise to a stiff straddling gait, and should be operated on and removed in the same manner as the testicle.

Castration of Cryptorchids—Klophengst.—This is the removal of a testicle or testicles that have failed to descend into the scrotum, but have been retained in the canal or abdomen. This operation calls for special skill, generally the outcome of long practice, and consists in the discovery and removal of the missing gland either through the channel which carries the spermatic cord to the scrotum, or by way of an opening made through the abdominal muscles in front of the scrotum. This is best left to the Veterinary Surgeon or one specially trained in the operation.

Castration in Stallions affected with Hernia.—It sometimes happens that in bringing up a colt for castration the scrotum is noticed to be of unusual size and doughy or pits on pressure with the fingers. This condition is known as Scrotal Hernia, and consists in several loops of the intestines having slipped down through the folds of the cord into the coverings of the testicles. In such conditions special care must be taken in the operation of castration. It would be unwise and dangerous to remove the testicle by any of the means just described, as the weight of the abdominal viscera would force the intestines out through the castration wound. The covered operation is generally employed under such conditions.

The animal is cast, placed on the back and the hernia returned to the abdomen.

After the usual washing and disinfection of the parts the skin is incised, and the testicles in their coats removed, the coats are allowed to remain intact and the clamp applied as near the abdomen as possible, tied, the testicles removed with the knife, and the clamps allowed to slough off.

SOUTH AFRICAN EXPERIENCE IN THE REARING, MANAGEMENT, AND IMPROVEMENT OF POULTRY.

Especially Applicable to Poultry Rearing on an Economical Basis.

By Mrs. Dora Theron, "The Cottage," Fort Beaufort.

[The following paper was awarded the first prize this year in the Essay Competition on Poultry, organised by the Port Elizabeth Agricultural Society in connection with the Annual Agricultural Show.]

The rearing of Poultry is an industry which is practically in its infancy in our country, and people are only now awakening to the fact that it can really be made a paying branch of farming,—the more so as it need not interfere with any of the farmer's usual occupations, but can be so easily undertaken by the women folk of the homestead, and rightly so, as they are so much better suited for the management and rearing of poultry than men, owing to the gift of their greater patience, and having more time at their disposal.

A little thought would show every farmer the valuable asset he loses by passing over this branch of the farming industry, an industry which in America ranks second only to wheat. Moreover, as, in this country, we are so often troubled by droughts, locusts, and the like—how well it would be to have this branch of farming to turn to when other things are practically at a standstill. The ready money which *can* and *should* be brought in by the eggs and poultry supplied to the various markets, represents so much extra profit and pleasure to the farmer, but, after all, as *profit* is the chief thing to be considered, we are bound to go in for poultry rearing on a much larger scale, and to do this I find that

Incubation

is the best method. "Mother Nature" is too slow—hens are not broody just when needed, or when broody there may be a scarcity of suitable eggs. The percentage, also, of mortality among incubated chicks (if managed as hereinafter explained), as compared with those brought out by the hen, is about equal, or rather in favour of the incubator. Personally, I take the chicks from the hens and place them in the "rearer," as the safest and surest way of bringing them up. Further—though I will by no means condemn the hatching of eggs by hens—had I only depended on this means, the increase of my stock, this year, would have been practically *nil*, as it has proved such a bad season for this method of chicken rearing. Others round about who keep poultry, but do not incubate, find their stock decreased, while I am several hundreds to the good.

Having decided, then, that incubation gives the better results, it would be superfluous to discuss the setting of hens, as only the slightest knowledge of poultry keeping is needed for this, and it has been gone into by so many writers, to the neglect of practical information on incubation.

Another, and a most important point in favour of incubation, is the obtaining of pullets all the year round, and hence the possibility of having eggs in all seasons, especially in the winter, without being restricted to the keeping of a certain class of bird for that purpose.

My readers will be anxious to know *what* incubator is to be recommended. There are several on the market, which may be good, though I believe in and used Tamlin's "Non Pareil" (*with* drying box). This machine is on the hot water system (which I have personally proved to be more suited to this dry climate than hot air), easily managed, gives excellent results, and with proper attention will "bring out" every fertile egg. To be successful in incubation, however, it is absolutely necessary to observe the following points:—

(1). The incubator must be placed in a nice, quiet, well-ventilated room. A Kaffir hut would answer admirably, with the exception that if this branch of farming is managed by the women-folk, it has the one objection of being out of doors, and the incubator might be neglected in bad weather.

(2). The incubator should be raised either on a brick platform or on a good solid box (*not* empty to prevent the vibration of the floor affecting it).

(3). Good, clean eggs, obtained from *various reliable* sources (to ensure healthy stock and to prevent inbreeding) must be used.

(4). Careful attention must be given to the working of the incubator and to the carrying out of the instructions found in the book accompanying each machine. An even temperature must be maintained to secure the best results, though it is marvellous what vicissitudes the germs can undergo.

(5). The machine must be treated as a *valuable* piece of furniture, great care being exercised in cleaning it; and, further, after each "batch" of chickens has been removed, the drawers and trays must be thoroughly washed and disinfected. In fact, throughout the whole period of incubation, I use Condy's fluid in the water.

(6). Careful attention must also be given to the lamp, as regards cleaning it, and the wick should be changed, at least, every other "batch."

One soon gets to know one's machine, and its manipulation becomes very easy, so that, except for the regular turning of the eggs night and morning, there is no trouble attached to it before the chicks appear. We now come to

The Chickens and the Task of Rearing and Management.

This is comparatively easy work during the warm months of the year. Finding that all poultry appliances are so very expensive for persons starting poultry farming, I experimented on rearing chickens without going to the outlay of foster mothers, etc.; and I found that I could suit myself equally well with the expenditure of a few shillings on boxes, and a little extra work. This answered well, except in the three coldest months of the year, when artificial heat is necessary to secure the *best* results. However, I considered that if I reared fewer in number during this time, I was amply repaid in having as, I think, stronger birds. Though I may be wrong in my judgment, yet I consider that artificial heat makes weaker and more delicate stock.

For the benefit, then, of those who, like myself, start on economical lines, I will here describe my method of rearing chicks, and I found that in comparison with three others who had gone to the greater expense of obtaining foster mothers, etc., from the start, I scored heavily, both as regards *healthy* stock and numbers raised (all using the same make of incubator).

First, then, when the chickens come out, I put them into the drying box for about 12 to 24 hours, without food; after which, I place them in a shallow box about 36 in. by 18 in. for about 60 chicks, covering them up *one* end of it with a nice warm rug—here they remain for a couple of days to gain strength, running in and out from beneath the cover to the lower end of the box to feed on some coarse, dry oatmeal, which is sprinkled about on a little *very* fine gravel and sand.

I then allow them to run about the incubator room for another day or so, according to the weather—now adding to their food canary seed, and once a day hard-boiled eggs chopped up *very* fine, shell and all, together with a little soft green food, such as water-cress, young lettuce leaves, dandelions, etc., and it is wonderful how fond the little things are of this, and how readily they learn to eat. They must be fed up to now every *two* hours—a small quantity at a time.

The chicks are now about a week old, and can be introduced to the outside world, being placed in a portable rearer made as follows:—A frame work 8 ft. x 3 ft. x 2 ft. has the one end, about 2 ft. 6 in., entirely closed with flooring boards in the shape of a box; one side of it works on hinges to open for cleaning while a small door-way, about 6 in. square, leads into the other part, which is a covered run made of ½ in. wire netting. This will accommodate 100 chicks. This should be placed in the most *wind*-protected spot, and I prefer it on gravel soil, as being always drier, easier to keep clean, and having the essential grit at hand.

This will now be their home for about three weeks, though it is best, I find, to still take one's chicks indoors at night, covering them up snugly in a box.

Judicious care must be exercised as regards food, which must absolutely consist of *green* food, together with a due amount of *animal* food and *hard* grain. As regards the first (which can partly be grown in shallow boxes in their runs), any tender greens, such as lettuce, etc., answer well. This should be chopped fine and mixed with a little boiled rice, to which a little well-boiled liver must be added once or twice a week. Hard *grain,* such as crushed Kaffir-corn (a most valuable food when ground *very* fine between two stones, as the Natives do it) or crushed wheat must form *one* meal a day, preferably the last feed.

On about the third or fourth day I give the chickens their first drink, and great care must be taken that they do not get too wet; a tumbler turned upside down in a shallow dish makes a good fountain (till profits will allow of proper drinking fountains being indulged in). It is very necessary that only good, clear water be used, and the vessels must be kept scrupulously clean.

At the expiration of three weeks the little creatures must vacate this home—most probably needed for a new batch—for a more spacious one:—A covered run 12 ft. to 15 ft. x 4 ft. x 2½ ft., the sides of which are of ½ in. wire netting, while the top can be made of larger mesh for the sake of economy. Inside this is placed a large open box, which serves for sleeping quarters, with a rug or bag thrown over. It is well to have several of these runs, for it never answers to mix small chickens of different ages, as naturally the younger and weaker suffer.

The feeding is still on the same lines—*animal, green stuff,* and *grain,* only that they need a little more at a time, but not so frequently. I occasionally let the little chicks out for a run in the yard, which they thoroughly enjoy, and which I find does them a lot of good.

After nine weeks or so the chickens can be treated the same as, and share in with, the big fowls, and they very soon learn to hold their own.

It is at this age I draft them off to a large run (a field about 120 yards x 50 yards) enclosed with 6 ft. wire netting, such as can now be obtained specially for poultry runs, small mesh at the bottom with 2 in. mesh above. In such a field I keep about 120 stock birds, together with such birds as I intend to send to market, about 250 in all. Each "batch," as drafted off, has its own quarters (on the "Colony System," as it is called) and shelters for sleeping in, 15 ft. x 6 ft. x 4 ft., to hold 40 chicks. I say "shelters," as experience teaches that fowl-houses in this country are to be condemned as conducive to disease, ticks, etc. These "shelters" are composed of a firm wooden frame, tarred and white-washed. The sides and roof are fairly packed with thorn branches, leaving the frontage open and facing the most suitable aspect as regards wind; thus, being of practically *no* cost, they can be at once *destroyed* should any disease of a contagious nature break out or should ticks appear. Each "shelter" is provided with low, *removable* perches, while in *front* of each is laid down a good strip of gravel, which, mixed with broken bones, crockery, etc., supplies grit. The floors of the "shelters" are constantly dug over, and occasionally ashes and a little sulphur turned in.

In the different "shelters" the nests are placed, a frame work of 6 or 12 nests on a raised pedestal to each "shelter." The backs of the nests are closed, or nearly so, while the fronts have a board two inches deep to prevent the eggs rolling out.

It will readily be seen that, as each lot of chickens has its own home, it is easier to stamp out any infectious disease that may occur. Should funds permit, it is advisable to have a large iron covered shed in the run, but which should *only* be used in case of very wet weather. This is certainly a great comfort, still I emphatically insist that chickens should be brought up to roost as much as possible in the open-air.

As Regards Feeding,

this should now consist of two meals a day. In the morning *soft* food, such as pollard and bran, or coarse meal and bran, together with such household scraps as may be on hand, mixed into a nice crumbly mass with warm water, and, say, once or twice a week some well-boiled stinging nettles and meat (plucks and the like) should be mixed with this—while it is always well to add as much green food, especially onions and shallot tops, as possible. In the evening hard grain must be given, preferably wheat, or Kafir corn, with other grain now and again, as a change—mealies and barley to be very rarely given if egg production be the first consideration.

I have my field ploughed and sown—half with barley, for first consumption, and the other half lucerne, as a standing supply of green—this is a considerable saving as regards food, and of paramount importance as regards egg production. Avoid all fancy foods so much advertised. These are fancy only as to price. Avoid also *over-feeding* (an error into which I fell when starting), as it renders the fowls lazy and unwilling to hunt for food, and so obtain the exercise so needful for health.

A liberal supply of *clear, fresh* water must by no means be forgotten—changed at least twice a day, and placed in a sheltered spot, as sun-burnt water is most injurious to fowls.

Before leaving the question of management, let me impress upon poultry-keepers the utter importance of *perfect* cleanliness at all stages and in all departments, with a liberal use of the rake, lime and dip. Above all, constant personal supervision, especially at feeding-time, in order to detect the slightest symptom of anything wrong, and at the *least* sign of indisposition, prompt measures must be taken, all sick birds being at once removed to a "hospital" (made similar to chicken run No. 2), which all poultry-keepers will find a necessity. All dead birds must be *burnt, not* buried. Prevention is better than cure, and to help ensure this, the use of Epsom salts and Condy's fluid alternately every second week in the drinking water, with an occasional Beecham's Pill, a pill made of wild aloe juice and meal, or some garlick, are the best and simplest aids, while, when moulting, a few grains of sulphate of iron may be added to the drinking water as a tonic.

Turning now to

The Improvement of One's Stock,

I certainly think that any one who can afford it, and after having gained some experience, should go in for thorough-bred birds—whether it be for egg-production or table use. If this be not possible, let the cocks at least be thoroughbred. Let us first consider the best birds to keep for egg-production. As in everything, people have their fancies. Some fanciers will say Orpingtons or Houdans are *the* birds to keep, others again prefer white Leghorns. I pin my faith on black Minorcas (or Andalusians), as I consider that these birds give by far the best yearly average of good, large eggs. I would also advise the keeping of a number of Plymouth Rocks in order to obtain a further supply of winter eggs. For table use Game or Wyandottes are decidedly the best. These latter I have proved to be well fitted for table, without any extra feeding, at about *five* months. They were heavy birds and well flavoured. However, it is impossible I find to lay down hard and fast rules as to *this* or *that* class of bird being the best to keep—each one must study his market, and find out, also, what are most suited to his own particular locality.

Seemingly, most Colonial markets demand white eggs, therefore the layers of such should be more generally kept, and amongst these Minorcas rank first. Wyandottes lay a brown egg, and though *not* particularly good layers, *yet* they should find a place in every poultry yard, as, being *large* and showy birds, they will always command a good price at market. I find, also, that for general utility, a good black Minorca cock mated with thoroughly good barn door hens gives good results, as their progeny turn out good layers, as well as fair table birds, if again mated with improved stock.

When drafting off my chicks at nine or ten weeks old the cockerels are put apart for sale, and the proceeds set aside for the purchase of fresh blood, which must yearly be introduced. Unless a hen be a particularly good layer she should be sent to market after the second year.

A different treatment in feeding must, of course, be observed with all birds being prepared for market, as the production of fat is now the all-important point. Mealies and mealie meal should form the chief food, with sufficient greens to keep them healthy. A glance at our markets shews us the careless way in which poultry is, for the most part, exposed for sale. This part of poultry-farming deserves more attention. Only a few birds should be placed in such a box as to present the best appearance. Buyers will soon recognise where this care is shewn, and the careful farmer will reap the benefit. This applies also to eggs, which should bear the date of production, and be placed in suitable boxes, which can now be bought cheaply, and the better prices obtained for such very soon cover the outlay.

There is yet a further side to poultry-keeping, namely, the breeding for exhibition purposes. It has been stated by some writers that this is not a profitable branch, and yet these same people are the very ones who go in for it, hence, we adduce that it *must* be profitable, and as the taking of first prizes in any shows at once lands the poultry-keeper on the high road to success, we again see the importance of each year improving our stock, and introducing first-class birds for that purpose, covering this outlay, as I have already said, by the sale of those rejected, and experimental stock.

We read in "Poultry Books" that fowl manure is also a valuable asset to the agricultural farmer. Owing to long-continued drought, I cannot speak definitely as to its merits, but I am now about to experiment with it and compare its value with other manures and fertilizers, and if found favourable, it will mean a considerable saving in the production of crops.

I must now turn to another branch of poultry farming—a branch of first importance, and hitherto even more neglected than fowl keeping, though one which undoubtedly can be made *more* profitable, viz.:—

DUCKS.

I can only refer to this shortly, as my own experience has not yet extended over any length of time.

I find, then, that ducks are easier to rear—less susceptible to disease—can shift for themselves sooner—and *last* but not *least* can be turned into *ready money* at an age when fowls are still in their infancy, and, if timed to be fit for market at the proper season, most handsome prices are obtained.

Though the percentage of duck eggs "brought out" by the incubator is not equal to that from fowl eggs, still the profits are very much in favour of ducks, therefore, taking the easier management and rearing, together with the *quicker returns*, into consideration, it is my intention to incubate every available duck egg during the next season.

The chief thing to contend against in ducks is lameness, but this can be overcome to a great extent by allowing the young ducks to sleep on *boarded* floors (boxes placed in the runs answer well.)

The same precautions as to cleanliness in fowl runs must also apply to ducks.

As regards feeding, I use, and with good results, only *soft* food (bran) *very* slightly moistened and placed beside a dish of clean water—for the *first* month—after which, I add a night feed of wheat or oats, soaked in a shallow dish of water—with an occasional feed of liver—a liberal supply of greens or boiled vegetables together with grit must not be forgotten.

As to the best kind of ducks to keep, I intend to go in for "Aylesburys" as they are suited to these parts, and being heavy birds, bring in bigger returns more quickly—they are also good layers.

Ducks should be shut up of a night as they almost invariably lay before nine in the morning and in this way the eggs do not get lost or fall a prey to rats, as is the case, when one's birds are left out all night.

A question often raised is—"Can ducks be reared without water"? I say emphatically "yes"—as, owing to the severest drought we have ever experienced, my ponds were all dry and I reared a nice lot of ducks, which are as healthy and heavy as if no such thing as drought existed. It can readily be understood that, when water had to be carried for almost a mile, more than a liberal supply of drinking water could ill be spared.

In preparing ducks for market it will be found that they lay on flesh quickly if kept away from water, with the exception of a swim now and again, as the exercise retards their fattening.

Ducks should never be kept in the same runs as chickens; this is always disastrous, as the mud and puddles in which the ducklings delight, mean death to young chicks, though, at the same time, it must be remembered that young ducklings *must* be protected from the rain.

With turkeys I have had no success, and would not recommend this branch for incubation. *Here* "Mother Nature" scores, as I find turkey chicks require more freedom—cannot stand any handling—. and do not learn to eat readily.

In conclusion I would remark that if the pleasant task of poultry rearing (and with incubators it is most fascinating) were taken up more largely in such a country as ours, and if beginners were less discouraged at any early failures, we might also then hear of an "African hen" doing its share in competition with the American hens which produce 20,000,000,000 eggs a year,—instead of having to see, as we do, figuring in our returns such articles as *Imported Eggs* and *Tinned Chickens*, and this could very easily be done if we studied our own interests more, and realized the value of an "egg and chicken crop."

I must admit we are making a move in this direction, when we see the liberal prizes the Port Elizabeth and other Agricultural Societies offer at their shows to encourage this important industry.

PORTABLE FLOATING HATCHING BOX FOR TROUT OVA

For Use in South African Streams.

Mr. H. A. Fahr, Acting Hon Sec., Frontier Acclimatisation Society, King William's Town writes:—I take the liberty of enclosing a description and two sketches of a portable Hatching Box for Trout Ova, which has been designed by Mr. F. G. Chaplin, now Curator at the Perie Trout Hatchery, and has proved highly successful.

The transport of trout fry has proved so expensive that, in order to make the best use of the funds at the disposal of the Society, it became urgently necessary to devise some means of distributing ova which can be safely transmitted for long distances, in the "eyed" stage at a cost of a few shillings per 1,000, by parcels post, thus enabling the Society to operate over a much larger area and deal with mountain streams which could not be reached by a heavy wagon loaded with fry in carboys.

Two of these boxes are now being brought into use on the Keiskama River for the present season's work and we have applications from several districts in the Eastern Province.

It has occurred to me that if the description and sketches were published in the *Agricultural Journal,* they would be brought to the notice of Farmers' Associations and other bodies interested in the stocking of Colonial Rivers with trout, who would be able to get a box made by any handy tradesmen.

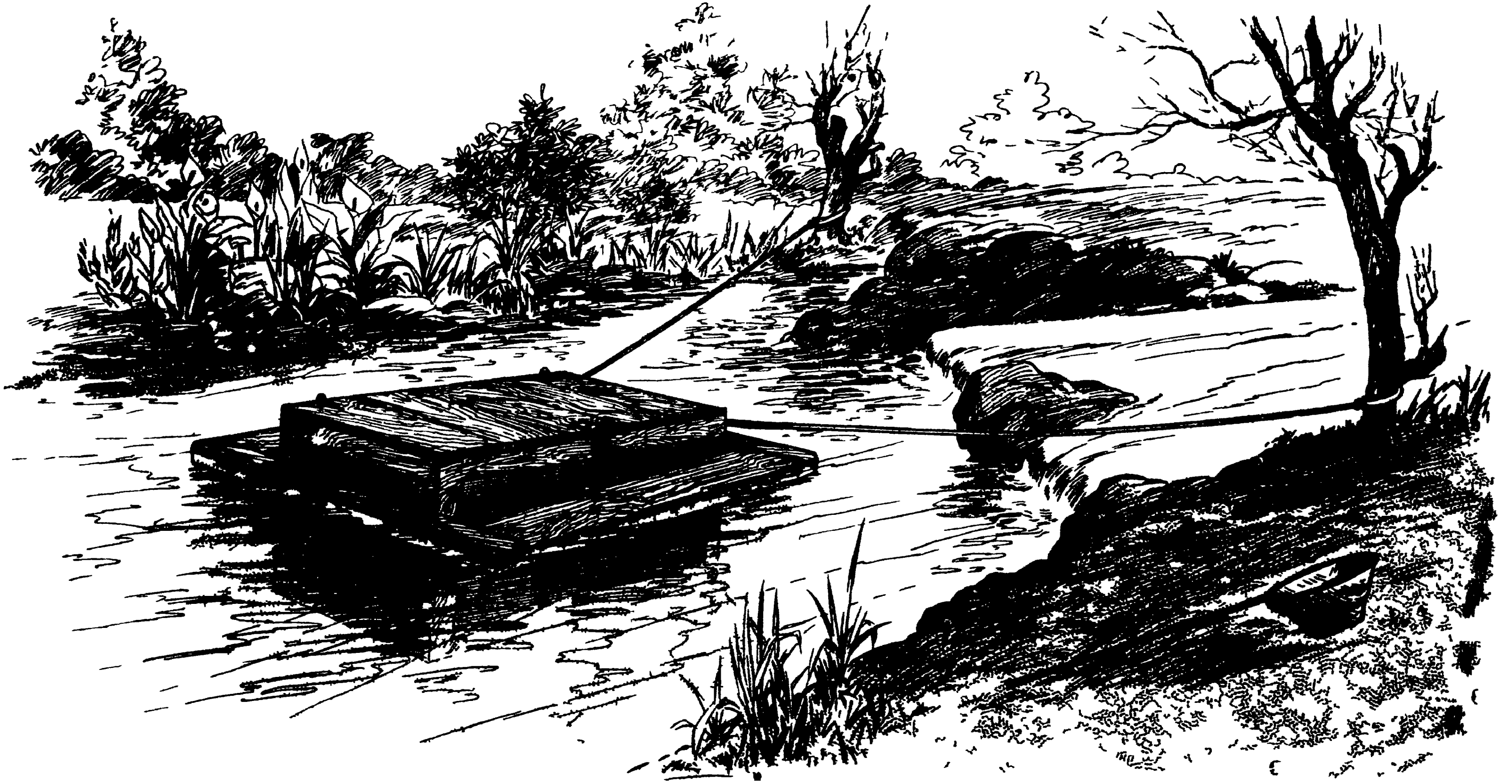
MEMORANDUM OF INSTRUCTIONS FOR THE FITTING UP AND USE OF A FLOATING HATCHING BOX FOR TROUT OVA TO BE USED IN SOUTH AFRICAN STREAMS.

The outfit consists of a wooden frame covered on the sides, ends and bottom, with perforated zinc and having a solid wooden lid. The box having wooden floats attached to the ends and sides all as shewn in the attached sketch No. 1.

The box measures 3 ft. in length, 1 foot 3½ inches in width and 1 foot in depth outside the framework which is made of the following scantlings.

FRONTIER ACCLIMATIZATION SOCIETY.

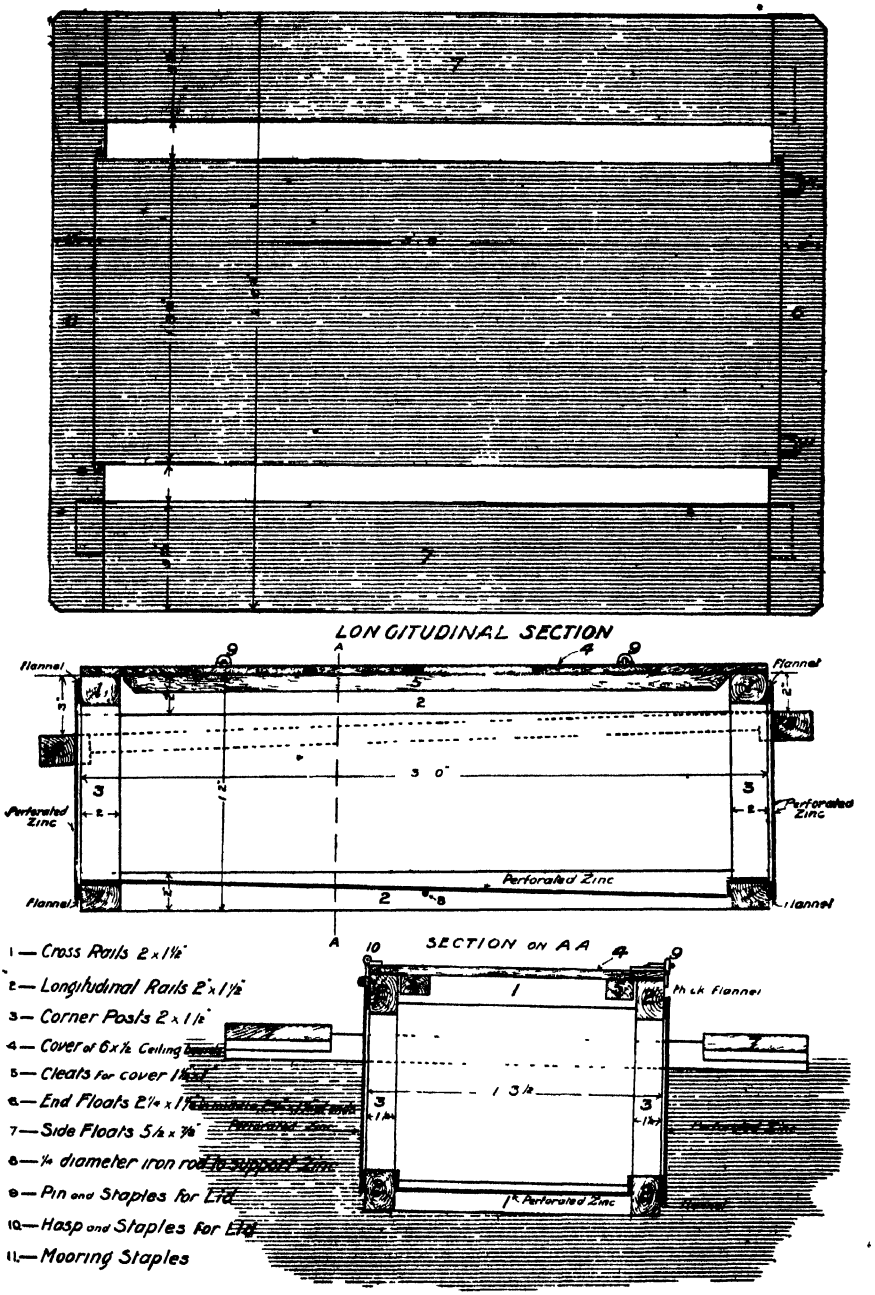
Sketch shewing Hatching-box in position.



FRONTIER ACCLIMATIZATION SOCIETY.

Details of floating Hatching Box

PLAN OF FLOATS



LONGITUDINAL SECTION

SECTION ON A A

1—Cross Rails 2 x 1½"
2—Longitudinal Rails 2" x 1½"
3—Corner Posts 2 x 1½"
4—Cover of 6 x ½ Ceiling boards
5—Cleats for cover 1½ x 1"
6—End Floats 2¼ x 1½ in middle, 2¼" at float ends
7—Side Floats 5½ x ⅞"
8—¼ diameter iron rod to support Zinc
9—Pin and Staples for Lid
10—Hasp and Staples for Lid
11—Mooring Staples

1. Cross Rails 2 inches by 1½ inch laid on flat.
2. Longitudinal Rails 2 inches by 1½ inch laid on the edge.
3. Corner Posts or Uprights 2 inches by 1½ inches.

All joints to be halved and thoroughly coated with red lead then securely fixed with stout screws. When the frame work is complete it should receive two good coats of asphaltum varnish, all over; the first applied thinly, and allowed to dry thoroughly before the second and thicker coat is applied.

The bottom, sides and end should be covered with No. 28 B.W.G. perforated zinc having 81 perforations to the square inch. The zinc to be bedded on strips of stout flannel and firmly tacked to the frame, care being taken that the portion covering the bottom is fixed exactly as shewn in the longitudinal section on sketch,

Immediately under the zinc bottom and in the middle of the box a ¼ inch diameter iron dowel (No. 8 on sketch) should be inserted as an additional support for same.

At the upstream end two strong wire staples (No. 11 in sketch) should be rivetted through the top rail for attaching the mooring ropes.

On one side two strong staples (No. 9 on sketch) to project above the level of lid and engage the pins on same should be fixed and on the opposite side a staple (No. 10) to take the hasp for padlock is required.

The lid or cover (No. 4) is composed of ceiling boards laid transversely and stiffened with two cleats or battens (No. 5) 1½ in. by 1in. Pins for the staples (No. 9) should be fixed in the required position on one side of the lid and a hasp (No. 10) on the other side to permit of the lid being secured with a padlock. The lid should receive two good coats of paint inside and out.

The floats are arranged at ends (No. 6 on sketch) and sides (No. 7 on sketch) of box and care should be taken to fix them at the heights marked on the sketch as it is essential the box should float with a slight cant up-stream to prevent the ova all rolling to the downstream end through the action of the current.

The side floats are arranged to leave a space along the side of the box for the removal of leaves, and tenoned into the end floats which are attached to the ends of the box with strong screws. All the woodwork of floats should receive two good coats of paint.

When made according to these instructions the box should float submerged to within about half an inch of the upper surface of the floats. Should it be found to sink deeper or float too high, the position of the floats can be altered by withdrawing the screws and altering the level of the floats at either end until the required buoyancy is attained.

Sketch No. 2 shews a general view of the box as it should appear when in use.

The box may be placed in any depth of water provided there is sufficient to float it freely, but the best depth is from eighteen inches to two feet and if possible a position below a rapid or low cascade.

where the stream has a clean rock or shingle bed should be selected.

A good current through the box is essential, and care should be taken that the box is set with its length in the same line as the flow of the stream and securely moored by ropes or wire to trees, rocks or other suitable anchors at least twelve feet up stream.

The ova are packed in muslin folded over so as to cover them and laid in boxes containing damp moss.

When the box has been placed in the stream the moss should be removed and the muslin containing the eggs gently lifted into the box and laid in the water. To liberate the eggs take hold of the two corners of the muslin and gently shake the eggs free when they will sink to the bottom of the box and may be distributed evenly by means of a feather.

Any fragments of moss or dead eggs (which can be distinguished by their chalky white appearance) should be carefully removed, and the lid of the box should then be closed and securely fastened by means of the hasp and staple provided.

The box may now be left for twenty-four hours and thereafter should be examined daily, care being taken to remove any leaves or other debris which may have collected against the perforated panels, and all dead eggs or fish must be taken out daily. The dead fish will have a dull white appearance.

As soon as the young fish have absorbed the yolk sac which may take from a fortnight to three weeks, and are seen to be swimming freely in the box, they may be liberated by gently submerging it in the stream and quietly turning it over.

Should it be desired to distribute the fish in different parts of the stream they may be taken from the box by means of a small hand net made of mosquito netting (see Fig. 3) and at once placed in a bucket of water and removed to the desired locality as speedily as possible where they can be emptied into the stream. It is not however, advisable to attempt transporting fry by this method for distances greater than a quarter of a mile. Should a more extended distribution be desired, after the first consignment of ova has been liberated the box should be taken out, thoroughly cleaned with a soft rag and removed to a new position where a fresh consignment of ova can be hatched out.

The box described herein should be capable of accommodating 5,000 ova provided it is given daily attention, and the cost of the apparatus complete should not exceed £2 sterling.

THE WINE SHOW.

This year's Wine Show will as usual be held under the auspices of the Western Province Board of Horticulture and will take place in the Town Hall, Paarl, on the 19th October.

In accordance with last year's intimation, prizes will no longer be offered for wines made from a special kind of grape, but for types of wine, so that wines made of one or more kinds of grapes may compete in the same class.

The object of this change is to make the shows of more educational value and intending competitors are specially reminded that Clause 5 of Regulations providing for information as to the system of wine making adopted, kinds of grapes used, etc., will be strictly enforced.

The Prize List is as follow :—

SECTION A. WHITE WINES.

Class 1. Best ten leaguers of the Hock type—light white wine.
„ 2. Best ten leaguers Sauterne type—white wine between Hock and Sherry.
„ 3. Best ten leaguers wine, Sherry type—heavy white wine.
„ 4. Best five leaguers sweetish white wine—Madeira type.
„ 5. Best five leaguers sweet white wine.

SECTION B. RED WINE.

Prizes in each Class—1st, £7 10s.; 2nd, £4 10s.; 3rd, £3.

Class 6. Best ten leaguers wine, Claret type—light red wine.
„ 7. Best ten leaguers wine, Burgundy type—full bodied red wine.
„ 8. Best five leaguers heavy dry red wine—Port type.
„ 9. Best five leaguers heavy sweetish wine—sweet Port type.
„ 10. Best five leaguers sweet red wine.

SECTION C. BRANDY AND LIQUEURS.

Prizes in each Class—1st, £7 10s.; 2nd, £4 10s.; 3rd, £3.

Class 11. Best two leaguers Wine Brandy.
„ 12. Best two leaguers Dop Brandy.
„ 13. Best half aum Van der Hum.

SECTION D.

Class 14. Best ten leaguers light white wine. Silver Cup.
„ 15. Best ten leaguers light red wine. Silver Cup.

The Cups valued at £10 each have been presented by Mr. J. W. Jagger, M.L.A.

The following Conditions will be strictly enforced, and the Prizes will only be given under the same :—

1. All Wines submitted for competition must be accompanied by a declaration from the exhibitor that they are the *bona-fide* produce of his farm and of the yield of the vintage of 1905.

2. An Exhibitor can compete with three samples under each class, but can only take one Prize in each class. No exchange of samples submitted for competition will be allowed.

3. The whole of the quantities prescribed for competition in the different Classes must, at the time of the Show, be in the Stores of the Producers.

4. At least one of the Judges or the Secretary will by personal inspection make sure that the Prize-takers possess the quantities required in each Class, and that the Wine is of the same quality as the samples exhibited.

5. The Prize-takers will be required to supply the Secretary of the Horticultural Board with all the information he may require in respect to variety of grape, site, soil, system of making wine, etc.

6. Until the Secretary of the Horticultural Board has informed the Board that the above conditions have been complied with, the Horticultural Board will not authorise payment of the prize money.

7. An Entry Fee of 5/- will be charged for each Class and must be prepaid to the Secretary Horticultural Board.

8. Four Bottles of each sample must be submitted for competition in every Class. The Bottles used must be "Bass's Ale Quarts," and no exhibit will be received unless this class of bottle is used. On each bottle the name of the Exhibitor, and the Class entered for, must be distinctly marked.

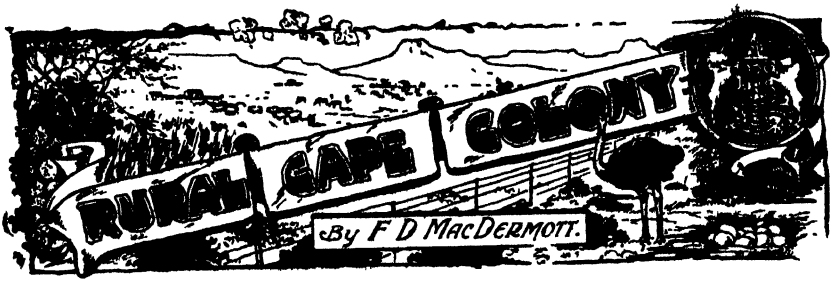
9. All Exhibits will remain the property of Horticultural Board, and Prize-winners may be required to send in more samples, so that there will be sufficient for public testing on the day of Show.

10. All samples must be sent to the Secretary, Farmers' Association, Paarl, not later than 11th of October, when all Entries will be closed.

11. In addition to the prizes a certificate of merit will be issued.

Any further information and entry forms can be obtained from the Secretary of the Horticultural Board, Stellenbosch.

C. MAYER, Secretary,
Western Province Board of Horticulture.



NO. XVI.

THE DISTRICT OF OUDTSHOORN.

There are very few Districts in this Colony that can be brought to the test, agriculturally, with a greater degree of confidence than that of Oudtshoorn, yet it ranks as one of those of which very little seems to be known, away from its immediate vicinity. The reason of this is not far to seek. Like many of the more productive sections of the Colony, particularly in the South-Western Districts, Oudtshoorn has been cut off from communication with the outer world, practically speaking, since the Western line connected Beaufort West with the capital. Until quite lately it has been more difficult to get to Oudtshoorn than to Bulawayo, and even since the railway has been carried into that thriving and promising region it enters it by such a circuitous route that there is very little temptation to people to venture there for pleasure. It is the irony of fate, that the very set of physical conditions which endowed Oudtshoorn with so much natural wealth should have been the means, also, of cutting the district off from earlier communication with its natural markets. Yet that such is the case, can be seen by glancing at a map of the South-Western Districts. It will then be noted that the northern boundaries of that section are the rugged mountain ranges of the Zwartberg. On the east the Kamnassie range flanks the basin in which Oudtshoorn lies, and on the south lie the Mountains of George, cutting the district off from the sea. It has now to be remembered that the greater part of the division of Oudtshoorn itself lies at an elevation of less than a thousand feet above sea level, so that the difficulties to be overcome in forcing a way into such a region are great indeed if railways are to be the means of transport. It is positively girdled with mountains. One line, that from Klipplaat through Willowmore, has been carried into the district and has its terminus at the town of Oudtshoorn, and hopes are rising that before very long the system now slowly progressing that is to link up the whole of the South-Western Districts with the Western Main Line will form a connection with that town on the other side, give the people an outlet west as well as east and north for their products, and thus assist them to forward the natural destinies of the whole section.

There can be very little doubt as to what those destinies are to be, for the wealth of the district in soil and water is not only great, but almost incalculable. The basin in which the greater part of the district lies is some sixty miles long by thirty in width, and consists principally of a calcareous loam, evidently the remains of a prehistoric lake, which was probably formed by the drainage of the mountain ranges around, the waters being afterwards carried off by finding their way through the Gouritz River Gorge below Calitzdorp. The whole region is impregnated with lime, right away back into the Zwartberg range, and the result is that almost any crop that can be named can be cultivated in these fertile valley bottoms. The rainfall is very slight, the mean average running less than ten inches per annum. But in a country where every little gully leads down from a range of mountains high enough to catch moisture laden clouds driven in from the Indian Ocean during the summer by the south-east trade wind, and in the winter are frequently covered with snow from the westerly influences which bring the storms along the Atlantic side of the Cape, the modest rainfall of this fertile valley is more than sufficient to meet all requirements beyond those supplied by the elaborate and interesting system of irrigation which has grown with the spread of cultivation.

THE MAIN WATER-COURSE OF THE DISTRICT

is the Oliphants River, all the other rivers and streams flowing into this at most regular intervals along its course. The Oliphants River seems to masquerade under several titles in the course of its placid career. It rises away back in the Karroo in the District of Willowmore, where it is known as the Traka River. From there it runs east and then almost due south until it passes through that magnificent gorge known as Tooverwaters Poort. Its peristent action in past ages has here cut a passage through the mountains some hundreds of feet deep, and in many places so narrow that one could fling a biscuit across. Through this wild and apparently inaccessible poort the railway line is now carried and the screech of the locomotive whistle awakens the echoes among the solitary rocks and frowning precipices which have hitherto defied the ages. Once through this gorge the river turns almost due west and continues its course along the valley below the foothills of the Zwartberg until it reaches Oudtshoorn. And along the whole of its course can be seen signs of comfort and industry unequalled in scarcely any other district of the Colony. Many can shew great fertility and prosperity in unevenly distributed spots but few can shew so large a population comfortably settled upon so many small holdings as can be seen in the district of Oudtshoorn. The further one penetrates into the district, too, the more marked these special features become, until, as the town of Oudtshoorn is nearing, the homesteads form a continuous

Welbedacht, the Homestead of the late Mr Richard Gavin, on the Oliphant's River, Oudtshoorn.

chain along the river's course, each linked to the other by the magic and wealth-giving irrigation furrows which intersect the whole of the valley-bottoms. The irrigation furrow is everywhere in evidence, but with all this extended system of distribution there is no sign of anything approaching conservation. The water flows on through the valleys, it is taken out here and there by means of weirs of the simplest possible nature; on every hand appears a system of the most elaborate and laborious works for the distribution of the running waters but no attempt to dam up a stream and conserve its waters for future use. This, I afterwards learned, is partly owing to the prevailing system which has grown up in the district among the irrigators, and partly to other causes with which I shall deal when I come to the whole question of the system of irrigation later on.

Greylands, the homestead of Mr. N. H. O. Gavin, at Wynand's Rivier, Oudtshoorn.

Thus the Oliphants River with very little variation runs its course west and south until it meets the Gamka, another river rising in the Karroo, which, after forcing its way through the Zwartberg, joins with the Oliphants below Calitzdorp to form the swift-flowing Gouritz which empties itself into the Indian Ocean west of Mossel Bay. The Oliphants River, it will be seen, is at once the main artery of the whole district, carrying off the storm waters that descend from the mountains and fertilising and enriching the already rich soils that lie along its banks by a continuous flow of water and silt from the upper levels. In addition to this main stream there are countless minor tributaries all flowing down from the mountains and each watering a rich section of alluvial land, carrying a fairly large population of thriving cultivators.

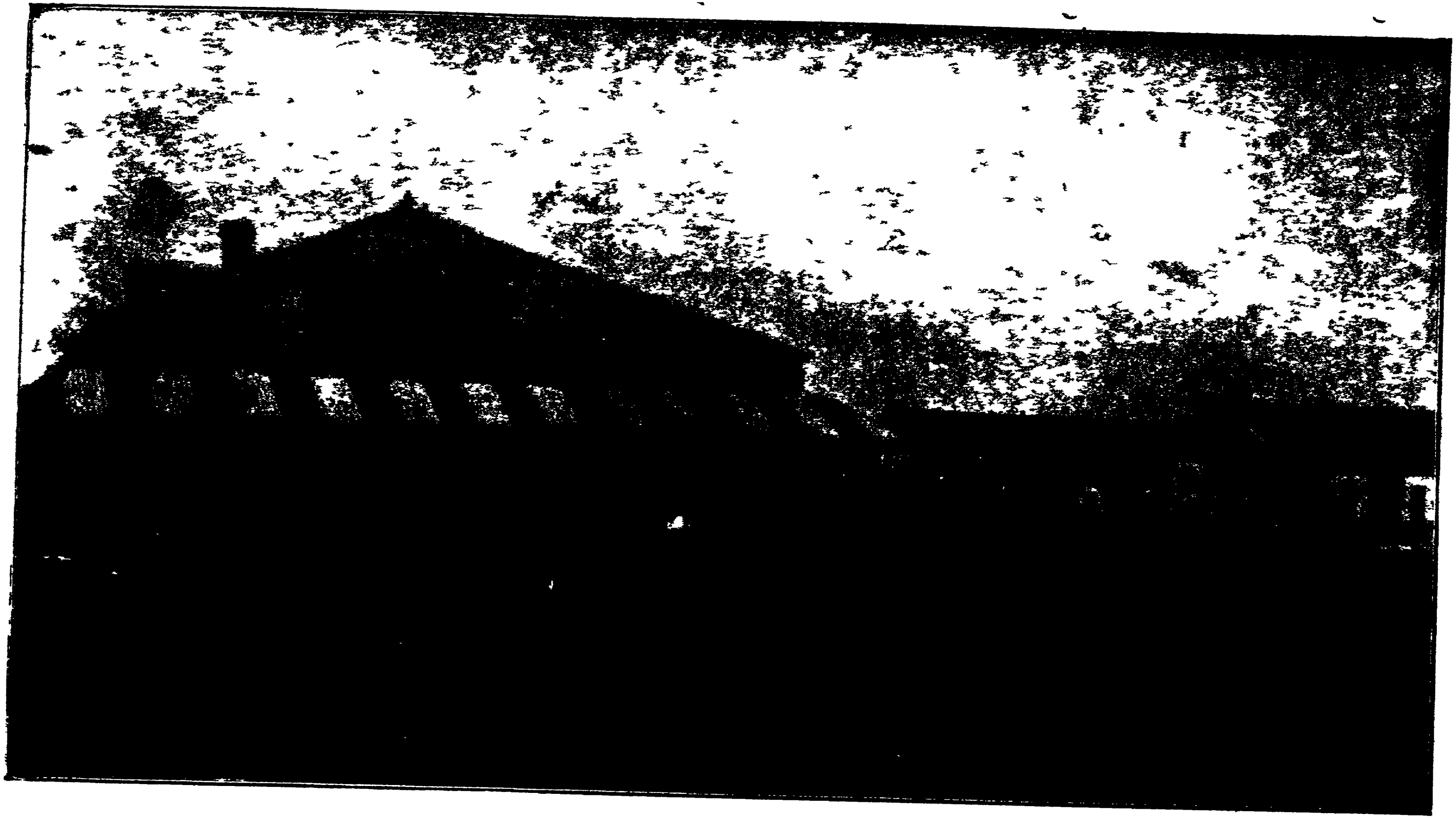
THE TOWN OF OUDTSHOORN

for instance, stands on the Grobbelaars River which flows down from the Zwartberg, through the limestone region in which the famous Cango Caves are situated, from there through wild mountain gorges to Schoeman's Hoek, one of the most fertile spots in South Africa, past Buffel's Drift, said to be the most valuable individual agricultural holding in the whole country, and on through Oudtshoorn to join the Oliphants a few miles below the town. The whole of the valley through which this small stream runs is watered from its banks. And here in the majestic hills and ravines that form the cave country I heard the first suggestion of conservation works for irrigation purposes. The ravine through which the river runs some miles above Schoeman's Hoek gets very narrow and wild. Just beyond this point, at a rather sharp turn in the valley, it widens out and irrigation is again possible. This is a particularly fertile spot and because of its peculiar situation is called Kombuis—or the kitchen. A proposal has been made to erect a dam across the river at the narrow part of the gorge and throw the waters back into the amphitheatre formed at Kombuis. This would mean of course, the entire inundation of the greater part of that farm, but the volume of water that would be impounded would be so great as to more than repay the cost of expropriation. It is estimated that the scheme would bring some thousands of acres of the town lands of Oudtshoorn under irrigation and revolutionise the greater part of the valley. The one serious objection which I heard raised to the scheme was the possibility that the rock might not hold the water after the dam was built. It has always to be remembered that the rock hereabouts is largely limestone and consequently of a very porous nature. So that even supposing the dam to be constructed of the most solid material and in the most perfect manner possible there would be little guarantee that the water would not find its way through somewhere or other once the level was raised. In a work of this description too much care cannot be exercised before a commencement is made, and considering how excellently the present system of irrigation has served in the past it is considered by many to be scarcely worth all the cost and risk involved in the larger works. As an instance of the uncertain nature of this part of the country a large water cave was recently discovered in the Cango in which a huge volume of water is stored away. It has not yet been fully explored but the water has been plumbed to a depth of 70 feet. Then there are rivers like the Kamnatie, which waters a large section of excellent arable land; the Wynands River, the Vlei, the Nels, the Klip, the Kandelaars, the Kleinpoort, the Hazenjacht, the Le Roux, and others. Each of these serves a more or less important area for irrigation purposes according to the average flow of the stream, and along the valleys formed by each are dotted at regular intervals thriving farms each with its section of cultivated ground flanked by grazing veld for stock. In a word the whole of the district of Oudtshoorn consists of one huge irrigation settlement of which the town is the centre, and the bulk of the people seem to have but one object in life—viz , to bring under irrigation more and yet more of the exceedingly rich land which is absolutely waste without irrigation waters. That is why the scheme to construct storage works at Kombuis has made such an impression. If these works were completed it would be possible to bring thousands of morgen under irrigation which are now bare veld, because the proposed scheme would raise the water level very considerably besides impounding a supply for times of scarcity. And even in Oudtshoorn they have times of scarcity when a few hours flow of a stream is worth hundreds of pounds.

LUCERNE AND IRRIGATION.

This short sketch of the conditions which have arisen in the district, owing to the very favourable natural conformation, will serve to explain some of the notes I took on the agricultural industries which have been established there with such great success. To go back a few years, it may be said that the agricultural history of Oudtshoorn really began with the introduction of Lucerne. Previous to that a great deal was accomplished in cereals, fruit, tobacco, and viticulture, but once it was found that Lucerne, the king of fodder plants, would thrive wherever irrigation waters were procurable, the prosperity of the district advanced by the proverbial leaps and bounds. Everyone who has ever taken any interest in the agricultural records of this Colony knows the important part played by the late Mr. Richard Gavin in the introduction of Lucerne to the Oudtshoorn district, but very few can realise what a struggle it was before the initial difficulties could be overcome. It all sounds so simple and so easy now, when we are able to tell the story with a happy ending, but those who first undertook the laborious work of cutting miles and miles of irrigation furrows to bring the river waters on to the Lucerne fields, must have been men endowed with great courage and a deep faith in the future. For we have to remember that in those days everything was in reality dependent upon individual effort, and when one sees what has been accomplished almost entirely by individuals, it gives one a far higher opinion of the pioneers. The laborious part of the task, however, was not finished with the construction of the furrows, for when it was found that water could be led on to the naturally level portions of the flats lying close to the river beds, and that Lucerne could be made such a highly profitable crop, it was only a development of the original idea to attempt to bring more and more land under cultivation by this method. But the extension involved much more labour than the original scheme. To make it satisfactory, it was found to be

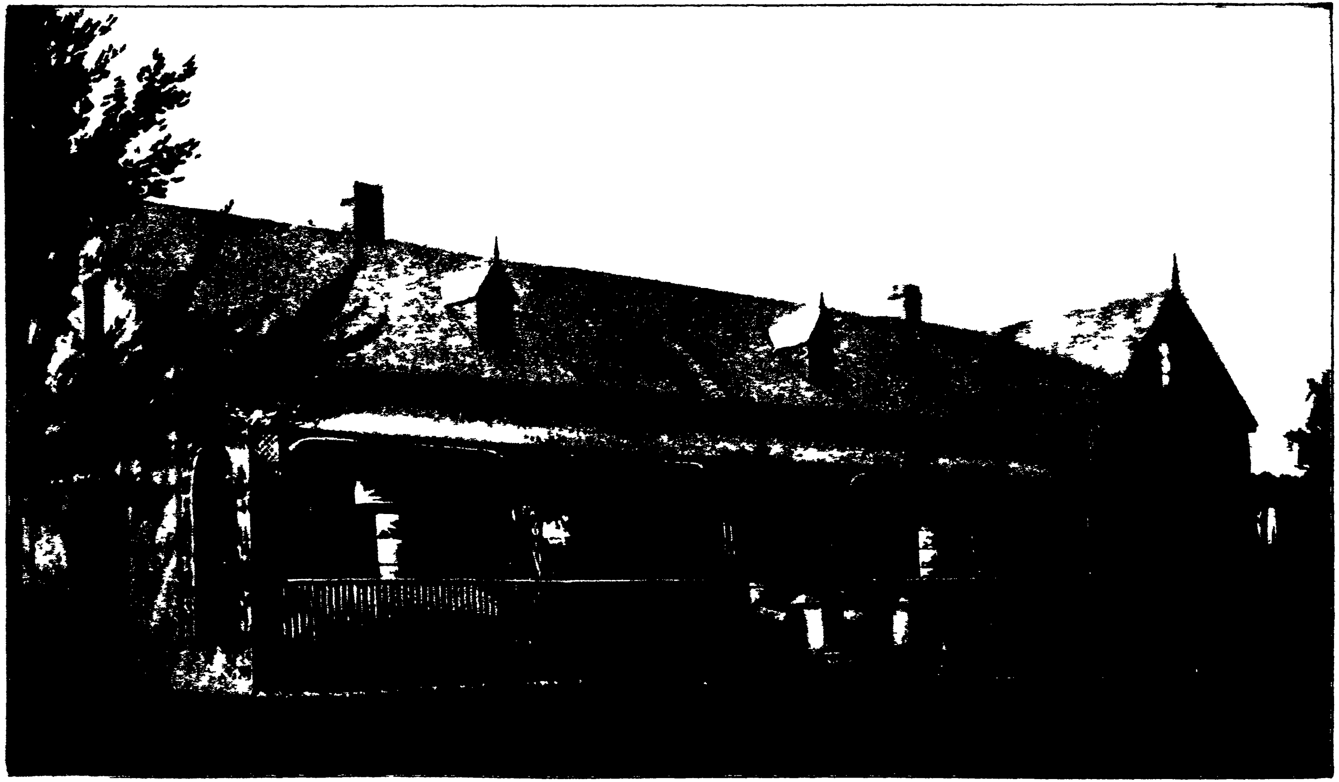
Group of Ostriches, Oudtshoorn's principal crop.



Mr Hans Le Roux's homestead, Kamnatie, Oudtshoorn necessary not only to bring the water on to the ground, but to so prepare the ground by levelling and grading that the irrigation waters could be kept in the soil for the longest possible period, With this advance upon the older methods came the most modern system of laying out the irrigation lands in "beds"—not so generally practised as it might be—and the general adoption of mechanical cultivation for keeping down weeds and aerating the soil after irrigation. The development of irrigation and the Lucerne Industry would, however, have been far from the success it has been had it not been for

THE OSTRICH FEATHER INDUSTRY,

which has grown to such enormous proportions throughout the whole of this section. It may be fairly stated that no other product but ostrich feathers could have thrived in such trying circumstances, for almost anything else that could be produced on Lucerne would have been so bulky as to prohibit its exploitation on a large scale. It has always to be remembered that, until quite recently, the only mode of getting produce out of the district was by ox-wagon over the mountain passes, and one can scarcely imagine a dairy industry, or any agricultural industry in fact, becoming established on a large scale with such a handicap. It might have been possible to have fattened livestock for butchering purposes, but this would scarcely have offered sufficient return for the enormous outlay necessitated in the establishment of the Lucerne, so it may be confidently asserted that had it not have been for the ostrich, the present position of the Oudtshoorn district would not have been so favourable as it is. The ostrich has undoubtedly made Oudtshoorn, and has caused to be set going the most elaborate, and, at the same time, one of the most comprehensive, systems of irrigation farming which can be met with anywhere. As one writer has so aptly put it in urging the advantages of the ostrich industry, the whole crop from an extensive farm can be carried out in a Cape cart, so that the question of transport does not affect it very much. And where such a rich pasturage as Lucerne can be cultivated with such comparative ease, a pasture upon which the birds not only thrive, but the quality of the feathers seems to improve, it is quite obvious that no better industry could have been selected. It will thus be seen that Oudtshoorn was doubly fortunate in this direction, though unfortunate in not being able to get into touch with the large centres of consumption. Had it been so ordered that the district could have got into closer communication with the great markets of the north for instance, at an earlier date, it is very certain that its output would have been considerably increased, more particularly in the shape of foodstuffs. As it is, there is a growing impression that the production of lucerne hay for market is just as profitable as feeding it to ostriches, and last year the railway carried away enormous quantities of that commodity for Johannesburg and other centres of consumption. What the future may bring forth it is not easy to say, but it is quite possible that something may occur to shake the general confidence now so firmly established in ostriches, and when that day arrives there will undoubtedly be a great change in the methods of Oudtshoorn. Where nothing can be seen now but flocks of these huge birds grazing the rich pasturage down, we may expect to see herds of dairy stock and flocks of sheep fattening for the butcher. Pigs and poultry, too, should make a great figure in this part of the Colony before many years go by. This Colony cannot go on for ever sending its millions away yearly for food-stuffs when such districts as this are lying practically fallow, merely awaiting development. Another serious side of this question is already attracting attention among the more thoughtful of those who give the matter any attention and that is the gradual but certain reduction in the rural population which the present system is bringing about even in the district of Oudtshoorn. In such a naturally rich section one would have thought that the poor white would have been unknown, but he is a growing factor in local affairs and developing into a problem of some dimensions largely owing to the success which has attended the ostrich industry. There are many large farms in the district that used, I am assured, to carry as many as a dozen to twenty families all doing well in their own way which now carry little else but the ubiquitous ostrich. As a matter of fact, the ostrich industry is rapidly assuming the dimensions of ranching, and as such requires far more space than it did in the old days. And the worst of it is that it calls for very few hands to work it. This a great advantage to the big man, but it is scarcely an industry that is calculated to build up a prosperous community. There is an evident need for something in the shape of agricultural industry to be introduced into the district to neutralise these effects, otherwise serious mischief may be done later on should fashion take a sharp turn against the flowing plumage which always seems to be in favour. Though this danger may be remote, there is another which our ostrich farmers would be wise to keep on the alert against. The success of this unique South African industry has attracted attention, and both in Australia and America attempts are being made on a very large scale to follow in our footsteps. These may prove successful or they may not, but if they do, the feather market must respond to the influx of larger supplies. In such a case the ostrich farmers of Oudtshoorn would doubtless feel the change less than others because in their lucerne they always have a marketable asset which would pull them through more difficult places than that could possibly be; but as the animal industry of the country is in such a bad way that we have to import our meat as well as our dairy supplies it would seem a feasible proposition for some attempt to be made to turn these rich pastures to account in the direction of meeting the deficiency in that direction. A good class of dairy stock and a few central creameries on the co-operative system would revolutionise the whole of the cultural industries of this district and in a very short time add enormously to the wealth of the Colony, by keeping money in it which is now sent away.



Mr E T L Edmeade's homestead, Kamnatie, Oudtshoorn

There would be no need for the farmers to sacrifice their birds. They could still keep them going and carry on dairying as well. But where the great advantage would come to the district would be in the possibility some such scheme would open up of getting the people back again to the land by providing them with an industry that would be staple and sound, and at the same time relieve the pressing necessities of the whole Colony. The development of the lucerne industry on these lines would bring greater actual profits than anything else that could be done—but all this involves, of course. the provision of facilities on the railways for the transport of perishables on a large scale.

THE SYSTEM OF IRRIGATION

has been mentioned and roughly outlined above, but a few details are bound to prove interesting. First of all it is most gratifying to be able to relate that the people of this district have been handling irrigation problems long enough to know that they can expect very little from irrigation legislation. They have developed their own legislation on this complicated subject, and one very seldom hears of any dispute which cannot be brought within the scope of the local practice. The system which has developed is one of division by arbitration. In the past the riparian proprietors on the upper reaches of the stream had a tendency to take as much as they could lay hands upon as their share of the river waters, but all that is gradually disappearing before the continuous action of arbitrators. While in the district I had the pleasure of meeting Mr. N. H. O. Gavin, of Wynand's River, whose experiences as an arbitrator in such matters is most interesting. He explained to me that the system now generally adopted is to divide the waters of a stream between the riparian proprietors in proportion to the extent of the irrigable land on each property, the nature of the soil being taken into consideration as well, for some soils need much more than others. This is managed by allowing each proprietor the use of the river waters for so many days, then it passes on to the next, and so on. This of course holds while the river is strong enough to fill the intake furrows. In case of the river failing the proprietor whose next turn it is to receive the waters takes the first flood that comes down. By this system a very fair division of the water is secured, and it has become so popular that nearly every stream in the district has been arbitrated upon in that manner, and those that have not, are expected to come under the system very shortly. Of course, there are cases where the bulk of the arable land is held by one proprietor or group of proprietors. In such a case the whole matter is simplified, but if these lands ever come to be subdivided again, as is almost inevitable considering the growing values, the water question will have to be again taken up and the division arranged as set out above. Some of the holdings are so large now as to preclude their economic working under one head, and there seems every probability that the system of tenant-farming must again come into vogue. It is partly in use now, but is carried out more on the "bywoner" principle, than the true tenant system. That is the tenant works on shares, and is not so independent as a tenant paying a fixed rent with a lease that gives him rights for a fixed period. When the tenant-farmer proper makes his appearance as a permanent feature of the Oudtshoorn district it will be with certain defined rights as to the quantity of irrigation water he can consume, and these rights will have to be fixed according to the flow of the streams, so that the system which has worked so well and has taken such a strong hold of the people is not likely to be abrogated.

WEIRS AND DAMS—SIMPLE BUT EFFECTIVE

The next interesting feature of this part of the country is the simple methods the irrigators apply to the works they construct. The most common form of dam or weir employed for turning the water out of the streams is a very primitive and far from substantial structure. It consists for the most part of a layer of bushes trailed into the stream and weighted down with stones and rubble to form a rough barrier. This, in the course of time, if it is not washed away, forms a fairly substantial weir, sufficient to turn the water out without interfering with the flow of the main stream, for the longer it stands the better it is owing to the constant flow of silt which comes down with every flood and serves to fill up the crevices with a cement like material. If it is washed away by a freshet it costs very little to repair, for a couple of "boys" with a few bushes and stones can replace the whole structure in a few hours. There is no lack of material handy so that there is no cost for transport.

The bush weir, or dam, however, is not satisfactory in every case owing to the instability of the river bottoms in some places. In a river like the Grobbelaars they answer well, but in the Oliphants River another story has to be told. The bed of the Oliphants is more friable, the ground much more loose, and less stoney, consequently it is more difficult to get a foundation. In this instance the difficulty has been to get anything to hold, short of solid masonry sunk to a great depth in the bed of the river. But the ingenious contrivance known as the "Wire Dam" has saved the situation. This is now fairly well known to readers of the *Agricultural Journal*, the method of construction having been described more than once. It consists of a huge net made with fencing wire and anchored in the bed of the stream. Into this stones and rubble are deposited until there are sufficient to form a barrier the required height, then the end of the net is turned over and made fast, thus securing the whole body and relying largely upon its weight to hold it in position. These weirs seldom give at all, and have proved most satisfactory where loose sands have to be contended with. It is just possible that the system may be extended some day and made to apply to works of a more permanent character, but for the present they answer a most useful purpose and hold their own with the best.

(*To be continued*).

CO-OPERATION IN AGRICULTURE.

THE GOVERNMENT LOAN SCHEME.

The advantages of Co-operation as applied to any established industry have been recognised the world over for the better part of a century, and except in the case of consumers whose means are limited, the system has in no case proved more successful than when applied to several branches of agriculture. When consumers come together for co-operative purposes the usual object is to enable them as a corporate body to buy on a large scale the various articles most commonly in use and act as their own distributors, thus saving the intermediate profit of what is known as the retailer. This form of co-operation is comparatively simple and has been generally successful where the co-operators have been people whose wants are largely similar. This form of co-operation has been applied to the needs of agriculturists with varying success, the most prosperous of these now extant being a Farmers' Co-operative Society in the West of England, quoted several times by H.E. Sir Walter Hely-Hutchinson, when speaking to agriculturists on the general question of co-operation. This Society was limited in its scope to procuring the requisite farm supplies for its members at the cheapest possible rates, and making every endeavour to see that they received the fullest possible value for their money. That form of co-operation is excellent so far as it goes. But when we speak of co-operation in Agriculture in a country like this we must be prepared to face a very different set of conditions.

The co-operation which the farmers of South Africa generally will have to look forward to is that form of the movement which will assist them to increase their production, and improve the quality of their products to such an extent as to enable them to compete in their own markets against imported articles. In fact when we speak in South Africa of Co-operation in Agriculture, what we really mean is the Organisation of Agriculture, for that is what is the real need of the country. The agriculturists are not the perverse backward, heedless, stiff-necked race that some of their critics are so fond of picturing them. The bulk of them are men who carry on a daily struggle against adverse conditions and uncertain seasons, which would break the spirit of any but those who know the marvellous recuperative powers of the country we live in, despite the apparent hopelessness of the moment. But where the agriculturists of this country do fall short is in their lack of appreciation of the value of united action. The majority of them having been bred in a sparsely populated country, and reared to rely almost entirely upon themselves, may be excused from realising to the full the practicability of the new doctrine, but they are a shrewd race and will soon fall into line once it is seen that the new movement as the Americans would put it, "means dollars." That is really the basic argument upon which the whole theory rests, and the sooner this fact is brought home to everybody concerned and all sentiment strictly excluded, the better will the movement progress.

The object of the Co-operative movement in Agriculture must be, primarily, to put more money into the farmer's pocket; secondly to secure him his natural markets by assuring regular supplies of even quality; thirdly to keep money in the country which is now being sent away; and fourthly to so expand the natural industries of the country as to force the possibility of more agricultural exports upon the attention of the people. With these objects before us it should be a simple matter to forward the movement so far as to take the fullest possible advantage of the Government scheme of loans to Co-operative Institutions formed for agricultural purposes. The prospect opened before the country by this scheme and its wise extension cannot as yet be fully appreciated. Should it prove successful it must mean an industrial revolution; but its success will rest entirely with the agriculturists themselves. So far it seems to have met with a very cordial reception at the hands of every assemblage of farmers to whom the scheme has been submitted, which is a very encouraging feature.

The first section of the community to take advantage of the scheme seems to have been the Viticulturists. The serious condition of the Viticultural Industry of late has been the cause of much anxiety to many of our publicists, who rightly argue that as the people interested are in such plights it is a question of public policy to attempt to restore prosperity to them. The difficulty that presented itself was, how was this to be done without pauperisation. The institution of central wineries was the one hope and this could not be done without capital. The Government scheme just fits in here, and among the first to take advantage of it we find were the viticulturists of Stellenbosch. A company is now in course of formation there for the purpose of taking advantage of the Government loan scheme and erecting a central winery for that district. With such an institution in their midst, the cry of the viticulturists should soon be changed, for it will enable them to turn out a more uniform quality of wine and, what is of equal, if not greater, importance, place them in a position to guarantee a fixed supply per annum and thus secure more stable markets. There is no reason why this movement should not be imitated in every wine-growing district in the Colony. Wellington, we learn, is moving in that direction and we have no doubt that the others will soon follow suit when they begin to realise the advantages that will be accruing. Worcester is taking the matter up also, while Constantia with creditable energy is so far ahead with its plans that an early start is contemplated.

The next Agricultural Industry which can be most advantaged by the Co-operative movement, is that of Dairying. It is impossible to over-estimate the value of a well organised dairy industry in a country like South Africa The market is here ready made at the door of the farmers. They have not to face the prospect of having to send a large proportion of their products to compete in the cheap markets oversea. All that has to be done is to so organise the industry that the imported article is driven out of the country, and once that is done the rest is easy. Some who have studied the question have asked how the supply is to be maintained without creating an embarrassing surplus. It is, of course, well-known that to meet the steady demand of the whole year for butter and dairy products generally, the supply in summer would be much larger than that in winter. They argue from this that it must naturally follow that one or two objectionable features must arise. Either the summer supply will be so great as to bring the price down below the profit-earning basis, or the winter supply must fall short of the demand. This is not a very far-sighted view of the question. With modern appliances and the provision of sufficient capital there is no reason to fear trouble of any serious dimensions from these causes. At the present time first-class Australian and Argentine creamery butter is landed at our ports and kept in cold storage for months before being consumed, independent of the time occupied in bringing it from the creameries to this country. If we can do this for the imported article it should not be beyond us to do something of the same for our own products. The more important phase of this dairy question will not arise here. It will be in impressing our farmers with a full appreciation of the value of laying by stores of fodder for the dairy stock in times of scarcity and keeping the supply of cream constantly going. The commercial side of dairying can cause very little anxiety, it will be the farming side that will need watching the closest, for it will not be sufficient merely to start a creamery. Full provision will have to be made to keep it going, otherwise the danger of collapse will come from the irregularity of supplies inducing merchants to again give preference to the imported article. Amongst the first to take advantage of the scheme in the form of Dairying is a group of stock farmers with a centre at Klipheuvel. The whole plans have been laid out by Mr. James Woodin, for many years Dairy Expert at Elsenburg, and machinery of the best and latest type has been ordered. This concern should soon be in full swing.

There is scarcely any need here to point out the various methods by which the scheme can be made beneficial. Farmers in the dry districts are talking of applying it to the purchase of drills, then there is the question of cheese factories in a country like Griqualand East. The whole of South Africa might be supplied from that section with excellent cheese if the industry were only set going on an organised basis. Meat and general supplies are talked of but that seems to be going a little too far as yet, although the institution of bacon factories in selected spots should be a legitimate development and favourably considered.

Appended are the regulations approved of relative to the loans for Co-operative purposes:—

LOANS TO CO-OPERATIVE ASSOCIATIONS OF WINE AND AGRICULTURAL FARMERS FOR GENERAL AGRICULTURAL PURPOSES UNDER ACT 43 OF 1905.

REGULATIONS.

1. Membership of Co-operative Associations to be confined to farmers and producers of agricultural produce.

2. A Co-operative Association shall consist of not less than seven members.

3. Advances will be made against such security as Government considers adequate.

4. Before making any advances, Government may require a report from an Advisory Board, to be constituted as follows:—

> The Civil Commissioner of the Division. Two members of the Divisional Council and one representative from each Farmers' Agricultural Society, or Farmers' Association in the Division.

5. The interest charged will be at the rate of 4 per cent per annum. Provision shall be made in each case for a Sinking Fund. The amount of the Sinking Fund will depend upon the nature of the operations carried on by the Society. The minimum contribution to be 2 per cent. per annum.

6. The Association will bear the cost of insurance, the policy to be lodged with the Government.

7. There shall be a right of inspection by the Government at all reasonable times.

8. The Government shall have the right to audit the books of the Association and may require periodical statements on forms supplied by the Government.

9. No building erected by the Association under Mortgage to the Government shall be used for any other purpose than that set forth in the Memorandum of Association without the previous consent of the Government.

10. The Articles of Association and Rules of Management of each Co-operative Association formed under these Regulations shall be submitted to Government for its approval.

11. Application should, in the first instance, be made to the Commissioner of the Division.

JACKAL-PROOF FENCING.

[CONTRIBUTED.]

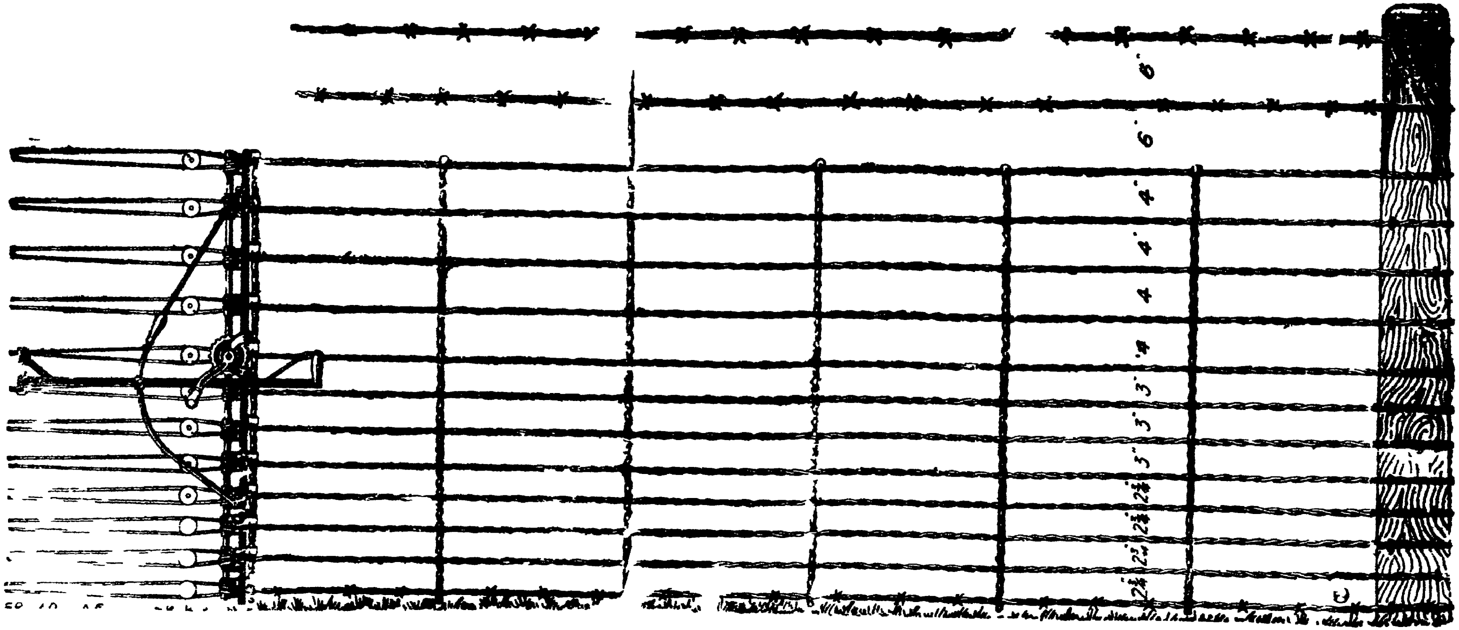
The object of this article is to endeavour to discover, firstly, what constitutes a Jackal proof fence; and, secondly, at what approximate price such a fence can be placed within reach of the farmer, whose farm is situated in a Jackal-infested district.

It appears to be generally accepted that the Jackal does not burrow, and this being so, the problem simply resolves itself into the question,—can wire fencing be erected with a mesh small enough to stop vermin, with wire sufficiently strong to ensure a reasonably long life to the fence, and at a cost low enough to make its erection worth while?

Where serious efforts have been made to cope with the pest hitherto, the fences tried have usually been some combination of plain and barbed wire placed close together and laced, or with the spacings wider and with wire netting attached; and many fences of this nature have undoubtedly proved effective. The cost of such fences, however, proves a very serious item, running into from £90 to £130 per mile for material and labour, and, although fencing—even at such a price—would certainly pay in the end, the initial outlay necessary to enclose a camp of any extent, say a square mile, is more than many of our sheep farmers can afford. Furthermore, these figures only represent the first cost, and where wire netting is used, constant repairs are necessary after the first couple of years, owing to the smallness of the gauge of the netting, which lasts a much shorter time than the rest of the fence, and has to be periodically renewed.

Having regard to these considerations, it is not surprising that our best farmers are turning their attention more and more to the machine made fences, which are being placed on the market, in the hope of finding equal or greater effectiveness at a less cost; and many miles, in the aggregate, of this class of fence, have now been erected in various parts of the Colony, more or less as an experiment, by the more progressive and enterprising of our farmers.

The two machine made fences which stand out from the rest as being the most worthy of attention, are the Cyclone Woven fence, and the fence woven by the Kitselman-Duplex Weaving machine. Both these fences are woven on the ground, and both can certainly be made vermin-proof, but they are entirely dissimilar in appearance, and the two machines have no resemblance whatever. A few details regarding these machines, their method of working and the results they achieve, may be of interest, and possibly of benefit, to readers of the *Journal*



CYCLONE JACKAL PROOF FENCE AND WEAVER

Height 4 ft · 11 Cables and 3 Barbed Wires spaced as shewn. Every fourth picket carried to the top barb to stiffen and support the barbs. Standards should be driven every 10 or 11 yards. Strainers may be either hardwood or iron. The machine is shewn cut off—its height is 4 ft 6 ins.

THE CYCLONE WEAVER

is manufactured in three sizes—4 ft. 6 in., 5 ft., and 6 ft.; the last being mainly intended for Poultry and Ostrich fencing. The 4 ft. 6 in. Weaver is sufficient for all ordinary farm purposes, weighs about 80 lbs. in its case, and costs £5. Its parts are strong, simple, and interchangeable, and can be easily and quickly adjusted to weave wires of any spacing from 2¼ ins. upwards. It rides backwards on the wires as it works, and can be put on or taken off the fence wherever the operator chooses; also, it weaves up and down steep grades as easily as on level ground, and being so light, it can be operated in the roughest country. A portion of the catchment area of the Table Mountain Reservoir has recently been satisfactorily fenced with this machine in extremely uneven and broken country, giving an excellent test of its efficiency under adverse conditions.

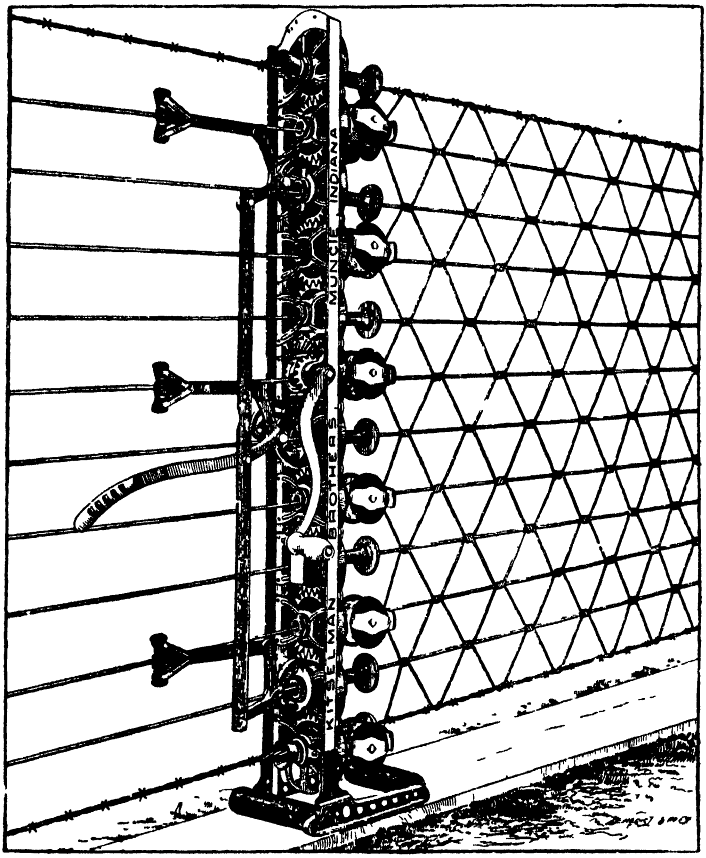
As regards the method of erection,—after the straining posts have been inserted in the usual way, the wires are run in pairs from handy wire reels (supplied with the machine), and made fast to the straining posts. The machine is then placed on the wires so that each pair of wires passes through a twister, and the turning of the handle results in the pairs of wires being twisted simultaneously into cables; as the wires are twisted the machine rides backwards. The crimped pickets (in Jackal fencing) are placed between the pairs of wires about 18 or 20 inches apart and rammed into the twist by the machine the handle of which is then reversed—the wires being twisted in the opposite direction which causes the picket to be locked tightly into the cable and has the further effect of preventing the wires behind the machine from becoming entangled. This process is repeated until the whole strain is woven, when the machine is taken off the wires along which it has travelled the lengths of the strain. The standards are then driven every eleven yards alongside one of the pickets to which it is wired and the fence is complete. Barb wire may be substituted for any of the cables by simply leaving the cables out and running and straining the barb in its proper position after the fence is woven. The barb is then attached securely to the pickets by means of a small patent loop or clip.

Taking into consideration cost and efficiency the most suitable specification is the one illustrated.

THE KITSELMAN DUPLEX.

is a little more difficult to describe, the machine having more parts and being somewhat more complicated, although the use of this machine can also be quickly learned by anyone of ordinary intelligence.

It is supplied in two sizes—50 inches and 59 inches, costing £7 10s. and £8 respectively and weighting with case 310 lbs. and 354 lbs. It does not ride on the wires, but runs on rollers along a plank placed upon the ground. It weaves a diamond shaped mesh gauge wire on to line wires of stouter gauge, the size of the mesh lated partly by the distance between the line wires, and by the distance between the twists of the meshes, and it is therefore possible to weave meshes of almost any size. Barbed wire may be used as line wires instead of plain wire, and the fence is wired to standards or stapled to poles.



THE KITSELMAN WIRE WEAVING MACHINE

As regards the relative costs and merits of the two fences, every farmer who investigates for himself will form his own opinion as to the latter. The cost of material for a mile of Cyclone fencing similar to that illustrated and specified is about £45 per mile for Cape Town or East London where the Company have branches,—they are not yet established at Port Elizabeth,—and to this must be added the cost of straining posts of which about eight to the mile are desirable in ordinary ground, but these can frequently be cut on the farm itself. The material for an effective vermin-proof

Kitselman fence can be placed on rail at Port Elizabeth for about £41 or £42 per mile by Messrs. J. R. Wills, Ltd. the local agents. The cost of labour varies in each case according to the capacity for work of the men employed.

Messrs. J. R Wills, Ltd., estimate for one mile, four boys at 2s. 6d. per day, for 18 days—£9. The Cyclone Co. claim that three boys can easily erect one mile of Cyclone in six days, and this being so the total cost of each fence erected would be about the same. But in considering the cost, value for money should be taken into account. The Kitselman provides a smaller mesh of 14 wire, but the weakest wire in the Cyclone is 14 doubled. The latter is incontestably the stronger fence, but the farmer must decide for himself whether the Kitselman is sufficiently strong not only for jackals, but also for all classes of stock. In both

Roberts Jackal Proof Fence.

fences a broken wire only affects a very small portion of the fence and is easily and quickly repaired. In the Kitselman, one weakness appears to lie in the possibility of the galvanism scaling or cracking early where the very short twists are made round the line wires. Mr. T. R. Davel, M.L.A., of Bethesda, Graaff-Reinet and other farmers have achieved satisfactory results with the Kitselman fence so far as present efficiency goes. Mr. Ferdinand Versfeld of Rhebokfontein, Darling, stated in a recent letter on the subject of the Cyclone Jackal Fence, of which he has six miles erected, "So far the fence has given absolute satisfaction and I consider it the fence of the future. I put 500 ewes to lamb in my camp and not only are the lambs and mothers 100 per cent better than another troop which I am herding and kraaling in the old way, but, in spite of the jackals parading round the camp nearly every night (which has made it easy for me to poison) they have been effectually kept out by the fence."

Both fences will doubtless find their advocates but any buyer would do well to carefully examine the relative merits of each.

It is unnecessary to urge—not the desirability—but the absolute necessity of fencing for successful sheep farming,—the gain in condition—the improvement in the quality of the wool,—the higher lambing percentages, and the saving of the cost of herding, are advantages so widely recognised as to require no emphasizing at this date.

THE ROBERTS LACING MACHINE.

is the latest of these appliances to be put forward, but we have no details of it beyond the fact that it is shortly to be put on the market. The patent has been applied for. The accompanying photo shows the fence as made by the machine. It consists of 14 barbed wires laced one foot apart. This photo was kindly left with us by Mr. Niland, M.L.A.

A PRACTICAL FARMER'S VIEW.

(*Paper read by* MR. JOHN ARNOLD, of Toise River, *before the Gaikaland Farmers' Association*

My only object in reading this paper is, that, having had several enquiries about the cost of a woven fence and its erection, and now that we have a "Vermin proof fencing act," I thought, perhaps by giving my experience, it would be of some benefit to those who intend erecting woven fences. I am giving four styles of woven fences:

1.—Ten cable wires and two barbs top and third wire all woven. Costing £67 0s. 1½d. per mile, including poles and erection.
2.—Half poles and half standards (6 ft. 6 in.) ten cable wires and two barbs, all woven, costing £62 13s. 7½d. per mile.

3.—All standards with five strainers, ten cable wires and two barbs, all woven, costing £60 10s. 7½d. per mile.

4 is what I call " The Ideal Fence."—Ten cable wires woven with three barbs, four inches apart, laced every yard, half poles and half standards costing £65 9s. 7½d. per mile. This fence, I consider hard to beat. It is a good height and if raised six inches from the ground and packed, will give you a 6 ft. 9 in. fence.

I have also worked out the cost of wire to erect " The Ideal Fence " on existing fences, including the six old galvanised wires, which runs out at £33 14s. 1½d. per mile. This includes cost of erection. I have allowed 10/- per 100 yards for weaving. I consider this a fair price. A neighbour had " Tots " doing it for 6/-, he found them a boy and they kept themselves.

I have also worked out the cost of wire you will require, supposing you have old iron wire in your existing fences, which runs out at £41 2s. 7½d. per mile including cost of erection.

I am also giving you the cost of old style of fence, viz.: six wires and one barb, for comparison which runs out at £44 2s. 5d. So, by taking "The Ideal" fence there is a difference in cost of £21 7s. 2½d. or,by taking style No. 3—the cost of the cheapest woven fence, there is a difference of £16 8s. 2½d.

Now, I ask you, Gentlemen, do you not think a farmer would be very foolish in erecting the old style of fence, when he can put up a good woven one for the difference of £16 8s. 2½d per mile? Supposing his farm is 1,200 morgen in extent, this would be about eight miles round, which would cost him £131 5s. 8d., more than the common seven-wire fence and if his neighbour goes him halves, this means it would cost him £65 12s. 10d. and he would then have a good woven and substantial fence.

The cost of a thirteen barbed wire fence, which I have carefully worked out, would be £72 16s. 8d.—eight wires three and a half inches apart and four inches, giving a height of 3 ft. 8in. To make it four feet you will require another barbed wire (two inches below woven fence) which would cost you another £2 17s. 4½d., bringing the total cost up to £75 14s. 0½d., a difference of £10 4s. 5d. per mile with the cost of the " Ideal Fence."

I am not condemning the barbed wire fence, but I consider it second to the woven; and I ask you, how many farmers are there who can construct a barbed fence to make it jackal proof? I say, "very few." I consider it should be laced every yard. Some farmers are using steel pickets, which will add very much to the cost of fence.

SIZE OF MESH.

Now, this is very important. *I* do not think it should be more than five to five and a half inches—that is from where the wire twists on to the cable wire. It is better to use a little more weaving wire than to have your fence unsafe.

Be careful in purchasing your weaving wire. I find if the galvanising peels off it is liable to rust. To test it get a piece and twist it into a knot; should it peel off then reject it.

Erection of Woven Fence.

In erecting a woven fence you will require good sneezewood poles and 6ft. 6ins. standards. This makes a very strong fence. I advise tarring standards after they are up, this will keep them from rusting, your poles, too, must be cleaned and have all bark and splinters taken off. If you adopt this plan, you will have very little trouble with grass fires. After all the poles are in, you can then put your weaver up against the straining pole. Endeavour to get your holes bored through strainer opposite the spindles of the machine, then run your plain wires out first, leave the barbs until last. I find it necessary to have strainers from three to four hundred yards apart. By doing this, you will find that your fence will be tight. It is advisable to use good straining poles and large stones for anchors.

To keep the cable wires in their places I use pieces of wood 3 by 3 inches, height of weaver, then put them up against weaver and mark distance between spindles—they should be four and a half inches apart Then drive galvanised screws or staples at an angle. I use one of these wire separators every third or fourth pole, when going through a dip, reverse the wire separators and have a bolt through pole and separator, You will find this a good plan, it prevents your fence sagging. It is advisable to have your wire strainer about 3 feet at the back of the strainer, so that the machine may pass, or have it further. The pieces that you cut off after having strained up will come in for tying fence to poles.

Taking the Machine Off.

Take top wire and strainer up, then middle and bottom. After this you can strain the rest up. I staple all wires next to strainer, this keeps the fence from going back.

My advice to all who intend erecting a woven fence is to go and have a few days with a man, who has had some experience. He will be able to get a lot of information and pick up some really good tips.

Packing.

My experience is that you must pack; it is the only safe plan I know of and I don't consider a fence jackal-proof without. By having your fence close to the ground (the old style) you will require another barbed wire to give a four ft. six inch fence; which means an additional cost of £2 17s. 4½d. and if you adopt the barb wire preventive plan (along the bottom) it will cost another £2 17s. 4½d. so that would be £5 14s. 9d. in all.

If stone is within reasonable distance you can pack a fence for, from 5s. to 6s. per 100 yards; two men should pack 130 to 150 yards a day in winter and 200 to 250 in the summer, providing you have the stone along the fence.

I have about three miles of netting with this so-called barbed wire preventive and all I can say is that I have had a lot of trouble with it.

Even if you have to ride your stone from a long distance you will never regret packing; it is money well spent.

Before starting to pack, tie the fence down in two places between poles (use good large flat stones for these anchors) try and have them even distances between your poles—about every three or four feet; then run a wire underneath stone and bring it up each side and twist it on your fence. After doing this commence packing. It is necessary to use a good stone and see they "jamb" up well. (Pack under the fence). If you adopt this plan you will find that baboons cannot shift them. Should stone be too thick, take a little ground out. You must have a hammer to trim stones up, and also a small bar. The latter saves a lot of lifting. You should have a man each side when packing. Packing is one of the principal things in a fence and to use the Australian Stud breeders' term "Make haste, slowly."

I know there are several farmers who think packing is too much labour and cannot be done, but "where there is a will, there is a way" and I am sure if we will only try and persevere we will overcome all these imagimary difficulties.

TRAPPING, DOGS AND MAINTENANCE.

Traps should be visited every day, and re-set after rains. A good plan is to oil part with some oil that has very little smell; this keeps the traps from rusting and being hard to set off. Set traps so that they won't require too much weight to go off. Use some coloured stuff for covering them; endeavour to get it the same colour as the ground.

My advice to all who pack is—to leave openings here and there (say every 400 or 500 yds.) The opening should be just the width of a trap. When set, it must be placed length ways. Never set a trap across a hole. The depth of these openings must be deep enough to admit a jackal without bending to get through. By doing this you will have good catches and very few climbers.

By keeping a good pack of dogs (for instance a couple of greyhounds, or a cross between greyhound and pointer, or the former and beagle, and a couple of Irish and fox-terriers) and letting a boy take these when he is visiting traps, is an excellent plan. Should a jackal get in, he won't remain long, but will try and get out again, and if a boy is hunting about with some good dogs, they stand a chance of getting him; besides Mr. Jackal does not like being worried and hunted about.

The cost to fence in a farm of 1,200 morgen which I consider is about 8 miles, taking the cost of the Ideal Fence at £65 9s. 7½ per mile, would be £523 17s. 0d. The interest on this amount at 4 per cent., would be £20 19s. 0d. per year. If your neighbour goes halves it would mean you are paying £10 6s. 9½d per year interest and you have your farm fenced in with a good jackal-proof fence, this is not the price of one herd, not taking into consideration all the other benefits to be derived.

In concluding I only hope and trust that this paper will be the means of inducing farmers to fence. The more I see of jackal proof fences, the more convinced I am that they are going to be the salvation of the Stock Farmer in this country.

The Cost of Fences.

The following statements shew costs in detail of the various fences mentioned :—

No. 1 Fence—all woven, two 3 in. barbed wires and ten cable wires —Johnson's resisteel (each roll of this runs out 962 yards) all poles.

		£	s.	d.
19	rolls at 13/6	12	16	6
9½	„ of porcupine barb at 12/9	6	1	1½
17½	„ of weaving wire „ 14/-	12	5	0
3	„ of No. 6 wire for Hercules stays at 12/-	1	16	0
171	poles at 2/- each	17	2	0
5	straining poles at 2/6 each	0	12	6
176	poles—erection at 1/9 each	15	8	0
½	roll of No. 6 wire for anchors at 12/-	0	6	0
1	„ „ „ 10 „ „ stapling fence to poles at 13/-	0	13	0
	Cost per mile	£67	0	1½

No. 2 Fence—Half poles and half standards.

		£	s.	d.
19	rolls Johnson's resisteel at 13/6	12	16	6
2	barbs, 9½ rolls at 12/9	6	1	1½
17½	rolls weaving wire at 14/-	12	5	0
3	„ No. 6 for Hercules stays at 12/-	1	16	0
86	poles at 2/- each	8	12	0
85	standards at 1/6 each	6	7	6
5	straining poles at 2/6 each	0	12	6
176	poles and standard, erection at 1/6	13	4	0
½	roll No. 6 wire for anchors at 12/-	0	6	0
1	„ „ 10 „ „ stapling fence to poles at 13/-	0	13	0
	Cost per mile	£62	13	7½

No. 3 Fence—All standards with five strainers.

		£	s.	d.
19	rolls Johnson's resisteel at 13/6	12	16	6
2	barbs—9½ rolls at 12/9	6	1	1½
17½	rolls weaving wire at 14/-	12	5	0
3	„ No. 6 for stays at 12/-	1	16	0
171	6 ft. 6 in. standards at 1/6	12	16	6
5	strainers at 2/6	0	12	6
176	standards and (5 poles) ereceion at 1/6	13	4	0
½	roll No. 6 for anchors at 12/-	0	6	0
1	„ „ 10 for stapling fence to poles at 13/-	0	13	0
	Cost per mile	£60	10	7½

No. 4 Fence.—"The Ideal Fence", height, 4 ft. 3 inches, 10 cablewires woven and 3 barbs laced every yard.

		£	s.	d.
18½	rolls Johnson's resisteel at 13s. 6d.	12	9	9
14½	„ No. 15 weaving wire at 14s.	10	3	0
13½	„ (3 barbs) 3 inch at 12s. 9d.	8	12	1½
3	„ No. 6 for stays at 12s.	1	16	0
86	poles at 2s.	8	12	0
85	standards 6 ft. 6 ins. at 1s. 6d.	6	7	6
5	straining poles at 2s. 6d	0	12	6
½	roll No. 6 for anchors at 12s.	0	6	0
¾	roll No. 10 for stapling fence to poles at 13s.	0	9	9
1	roll No. 10 for lacing barbwire	0	13	0
	Cost of erecting 176 poles at 1s. 9d.	15	8	0
	Cost per Mile	£65	9	7½

Cost of wire to erect a woven fence 9 wires woven and 3 barbs on top. With 6 old galvanised wires on existing fence.

		£	s.	d.
	Weaving wire for 9 wires	9	3	9
5½	rolls Johnson's resisteel at 13s. 6d.	3	14	3
13½	„ barbed wire at 12s. 9d.	8	12	1½
3	„ No. 6 for Hercules stays at 12s.	1	16	0
½	roll for anchors	0	6	0
	Cost of erection 10s. per 100 yds	8	16	0
1	roll No. 10 for stapling fence to poles	0	13	0
1	„ „ 12 for lacing barbs	0	13	0
	Cost per Mile	£33	14	1½

Cost of wire and erection on old fence.

		£	s.	d.
16½	rolls cable wire at 13s. 6d.	11	2	9
	Weaving wire for wires	9	3	9
13½	rolls of barb wire at 12s. 9d.	8	12	1½
3	,, No. 6 for Hercules stays at 12s.	1	16	0
½	roll No. 7 for anchors at 12s.	0	6	0
	Cost of erection wire to staple fence 10 poles	8	16	0
1	roll No. 10 at 13s.	0	13	0
1	,, to lace barbs	0	13	0
	Cost per mile	£41	2	7½

Cost of old style of 7 wire fence 6 plain and one barb.

		£	s.	d.
22½	rolls No. 7 galvanised wire at 12s	13	10	0
84	poles at 2s.	8	8	0
83	6 ft. standards at 1s. 4d	5	10	8
9	strainers at 2s. 6d.	1	2	6
4½	rolls for 1 barbed wire at 12s. 9d.	2	17	4½
175	lbs. wire for laces No. 9 at 12s. 6d. per 100 lbs	1	1	10½
1	roll No. 7 for anchors	0	12	0
	Cost of erecting 176 poles at 1s. 3d.	11	0	0
	Cost per mile	£44	2	5

Cost of a 13 barb wire fence (8 wires 3½ inch apart 4 wires 4 inch) height of fence 3 ft. 8 inches.

		£	s.	d.
58	rolls of porcupine barb 3 in at 12s. 9d.	36	19	6
84	poles at 2s. each	8	8	0
83	6ft. standards at 1s. 4d.	5	10	8
9	strainers at 2s. 6d.	1	2	6
1	roll No. 7 wire at 12s.	0	12	0
3	rolls No. 12 for lacing, at 13s.	1	19	0
	Cost of erecting 176 poles at 2s.	17	12	0
1	Roll No. 10 stapling fence to poles	0	13	0
	Cost per mile	£72	16	8

IMPRESSIONS ON THE VALUE OF AGRICULTURE.

Paper read by Mr F. B. Slater, *before the Central Albany Farmers' and Fruit Growers' Association.*

I offered at your last meeting to give you some impressions made on my mind while attending the Farmers' Congress. I had no idea what a task I was setting myself, not for want of impressions, they come easy enough—but to select those that are suitable and to put them down in black and white. Education, training, and experience—three things I have not—are required. I must therefore say at the outset that no literary merit is claimed for this paper. The first impression that crossed my mind as I sat in the commodious Hall belonging to the Dutch Reformed Church in Somerset and kindly lent for use, was the importance of such a gathering—men, delegated from nearly every district in the Eastern Province—and all, apparently, eager to do something for their respective Associations and for the Colony at large.

The majority of the delegates were quite strangers to me, but the venerable President Mr. Hockley I had known for over thirty years. He is one of those true Britishers, the genuine stamp of a true man. Of the two Vice-Presidents I had met the honourable Mr. Hurndall who is known as the successful Angora farmer of Aberdeen, Mr. John Arnold I met for the first time, but his name was quite familiar to me, as to most Colonists, as one of the progressive sheep farmers of Cathcart. The Secretary, Mr. Hall, I have known for many years. Of the rank and file of the members Mr. L. Roberts of Fort Beaufort, Mr. Bonnin Hobson of Vryburg. Mr. Baker of Willowmore, Mr. Goulden of East London, Mr. C. Arnold of Queenstown and some others are men who will make their mark in the Legislature of this country—if time and chance are given them. The impression that next arose in my mind was.—What do all these men want here? And what have the successful stock farmers of the Karroo to complain of? I could understand the men from the Coast districts where stock diseases innumerable play havoc, rust and blight destroy their crops, their fruit and orchards destroyed by codlin moth and insect pests, wanting legislative measures passed so as to get scientific and professional experts and experimental farms established to investigate and find means to overcome these pests. I knew also the burden of the delegates from the districts of Komgha, King

William's Town, Victoria East, Albany, Fort Beaufort and some others. Once the finest sheep walks in the country, producing tons of wool,—but now ruined by the disease known as Heartwater. I say I could understand them still hoping and urging on Government to continue the experiments and investigations in the hope that some remedy may be found.

But the Karroo farmer, what can he want? Surely he is successful enough. I found however that he also had his troubles. He needed more drills for boring for water, and assistance to build dams. But his great trouble was sluiting, the dry seasons and the trampling of the stock loosened the soil and the floods came and washed it away. Millions of tons of valuable drift soil was being carried away every year and by this means large tracts of once fertile country were becoming barren.

Individual farmers had done much to prevent this. Mr. Baker, delegate from Willowmore gave Congress a very interesting account of what he had done on his farm to stop the sluiting and secure the drift soil from being washed away. He built three barriers at different distances across a flat laagte. They soon silted up and made some of the most valuable land on his farm for this silt soon became covered with weeds first, then grass and Karroo bush. On one of these alluvial deposits he cultivated some mealies and pumpkins, and, although the season was dry, he got good crops. Any water coming down the laagte spread all over, the land being so level.

The impression that then forced itself upon me was how are we to stop all this sluiting in the Karroo, and make vlei land of it?—and how are we to sweeten all our zuur veld or coast lands stretching away from the Knysna forests to the Natal Borders, and restore the once splendid sheep districts to their original state? It would take millions of money to do it; and we should have had the money to do it, if we had not been such simpletons. Providence gave us bags full of gold in the shape of diamonds and the State allowed them to be emptied for a mere pittance.

The Transvaal Colony has learned a lesson from our experience, for that State now claims sixty per cent. of the diamonds won. It is to be hoped that they will make good use of it and develop their Agricultural resources.

The impression arises, or the question may be asked:—Is it necessary for a country, say for us, to develop agriculture? We grow wool, mohair, ostrich feathers, and with an income tax, also one on diamonds and with the usual import duties, why not buy our agricultural products? Would it not be cheaper, than in spending so much money on a dry country like this? Can it ever be made to produce its own food? Yes I think it can. And in answer to the first question, I would say it is necessary, for no country has yet developed into the industrial and commercial stage unless its agriculture was first developed, and no country has yet developed into a great nation without manufactures and commerce.

The first stage of civilisation is the pastoral. When tribes, white or black, give up their wild state of getting their living by hunting or fishing and making raids on their neighbours, and settle down getting flocks of goats or sheep and herds of cattle that is the first stage towards a civilized life. The next is the agricultural, and then if that is successful, the industrial and commercial, there may be a further stage or stages towards a higher development, or civilization, but no nation has yet got beyond the commercial.

We are all familiar with the expression, that agriculture is the back-bone of a country. But is it a fact and can it be proved? Well, gentlemen, I can point you to Australia and Canada. Their pastoral and agricultural stages are developing rapidly and signs are not wanting to shew that they will soon be in the industrial and commercial stage. The United States of America through her successful agriculture has developed into the industrial and commercial stage, and are now rivalling the older kingdoms, in their commerce. These latter kingdoms and empires reached their high and proficient state of commerce through their successful farming.

Let us go still further back—and look into the ancient history of the great and powerful Empires of Rome, Greece and Egypt. Within the realms of the Roman and Grecian Empires can still be found, constructions in the shape of cisterns, reservoirs and channels to assist in the work of agriculture. And many of these are in use to-day, though built so long ago, which shews how splendidly they were made. But I think the most wonderful are those built by the ancient Egyptians. Wonderful when we consider the ages they have stood. We all know what wear and tear time has on man's work, and even how the face of nature is changed by the roll of ages. Now we are not quite sure how long ago the first great work which still stands was made. Chronologies differ. According to Moses it is between four and five thousand years ago. What a time when compared to our own British Empire! Why it is not 900 years since the Norman Conquest. And yet students who have studied the monuments and history of Ancient Egypt tell us that *Menes* the Egyptian king who first stands out at the dawn of history, who consolidated Egypt into a single State by uniting Upper and Lower Egypt, was the first of 31 dynasties of 372 kings or a successive rule of 5,500 years till conquered and overthrown by Alexander the Great. Well, it was this king who first developed the natural resources of the Nile. We are apt to think that the flooding of the Nile was the work of Nature. It was, but only in the same degree as our storm waters do for the Karroo. It was the work of man to subdue and utilize the flood waters of the Nile, as it is ours to make the storm waters of South Africa serve our need. Let us see what this first king of Egypt did. History tells us that "He is signalised by his great engineering work which would have been a considerable achievement in the present day. He built a great embankment *which still remains* by which the course of the Nile close to the Libyan hills was diverted to assist and regulate the flow of the inundation. This great work may be compared for magnitude and utility to the modern barrage carried out by Sir Colin Moncrief"; you will remember that this latter work cost about a million pounds. And then Amenemhat III who reigned some centuries after Menes, also did a great work, in fact it is said to be one of the greatest works of hydraulic engineering the world has seen. He took advantage of a depression in the desert limestone near the basin of Fayoum to form a large artifical lake, connected with the Nile by canals tunnelled through rocky ridges and provided with sluices so as to admit the water when the river rose too high, and let it out when it fell too low, and thus regulate the inundation of a great part of Middle and Lower Egypt, independently of the seasons.

This was the secret of their success. The old, old saying "There is still corn in Egypt." has come "down the ringing groves of change" to the present day. But it was this fact that made old Jacob send his sons, more than once, down to Egypt to buy corn. It was this fact that brought those heavy laden caravans from all the then known parts of the world. They had no trains in those days All their transport was done by the ass, and the camel. Thousands of these animals must have been used to carry the products of Western Asia from the Euphrates and Tigris to the borders of the Mediterranean and Black Seas, and by the great commercial route from Babylon, and from Southern Assyria across the Arabian desert carrying spices and other much valued products, and from the South, Nubia, the Soudan, down to the equator had commercial relations with this mighty Empire, the centre of commerce. What an enormous amount of wealth must this commerce have brought to the Empire !

Its tombs and monuments, its sculptured sphinxes and obelisks, and the wonder of the present day—those numerous and enormous blocks of masonry, the Pyramids—shew that Art had reached to an extraordinary perfection. The only conclusion we can come to is that this powerful Empire achieved its success by utilising its flood waters. We must remember that Egypt is worse off than we are in respect of rain.

I was deeply impressed with the fact that our success as farmers depended on unity. If we are not united we will not succeed. But united, we farmers will be a power to be reckoned with. As farmers we must be in one camp, and stand shoulder to shoulder, and meet as farmers on a common platform to discuss farming matters only and to look after agricultural interests.

If we are united we may make our demands felt. And whatever the political views of the Government may be, they will be obliged to listen to us. For unless we are able to do this, the country will be swamped with foreign produce, before we are able to develop our own. The time will come for free trade, but all new industries must be protected. We must be united to fight against any Trusts that may be formed.

The poet says "Who aimeth at the sky shoots higher than he that means a tree." Are we to be forever crawling in the dust. Can we take in the idea that this sub-continent of Africa is going to be a great commercial and industrial state, a strength to the British Empire? If that is our aim, we must develop our agricultural resources, for that is the only foundation on which commerce and manufactures can rise. I am not now looking at the Cape Colony isolated, but at the whole of this great continent South of the Equator. There are great possibilities. Anything, and everything under the sun can be grown on one part or the other of this vast area. Natal is well adapted for tea growing, and the Natal sugar very nearly supplies the Colonies of Orangia and Transvaal. There are already plantations of tea, coffee and sugar-cane in and about the great Lake districts North of the Zambesi river, and they are said to be a great success.

Cotton is being tried in Rhodesia and I believe answers well. Some specimens sent home lately were a surprise. In fineness and strength, they are reported to be equal to some of the best United States grown.

I would only touch on manufactures in so far as they relate to agriculture, and I would like to point out to you the wonderful asset we have in the Victoria Falls. That power once tamed and harnessed and set to work, we shall have an industrial city there that will be among the greatest in the world, a huge emporium that will swallow up all our raw material. Therefore, gentlemen let us keep up our local associations, let us do our best to get every man who has the farming interest at heart to join.

A great deal of our success depends on our Farmers' Associations. We must not think of ourselves as isolated little bodies of men for as such we will not do much, we must keep ourselves well in touch with the Central Association by sending our best men to attend Congress, so that through them we may learn what is being done and what difficulties are being overcome by our fellow farmers, in other parts. Thereby we may be enheartened and take fresh courage to trample our difficulties under foot and set about overcoming our present numerous pests. Inter-colonial Congresses are also very necessary. The Central Association of each Colony must send delegates to attend a Congress once a year, or once in two or three years to discuss Inter-Colonial Farming Matters, so as to arrive at a mutual understanding and so be a mutual help.

THE SOUTH AFRICAN STUD BOOK

A Few Notes on the Work.

By C. G. Lee, Organising Secretary.

The past month (July) has been a merino sheep month—after a vast deal of correspondence (during the five months of actual Stud Book work) with many merino sheep breeders and after the meetings held to discuss the registration of sheep, and the qualifications necessary to admit sheep into the Stud Book, one would naturally expect some fruits. There is reason therefore for congratulation, when it is now discovered that the talk, the many letters, and the important resolutions, dealing with the merino section of the Stud Book, have resulted in the attached circular, which really means the talk, the correspondence and resolutions, (of the various meetings) all put into a concrete form and submitted to the breeders for approval. The circular has been accepted with the exception that a minority wanted 85 to be the number of the foundation flock instead of 55 as the circular states. But then those who favour 85 know full well that they still have the opportunity of pleading their views and in the meantime they can go on with the work of registering their 55 sheep. One voted for an amendment of the standard of points, and one against clause six. One wished 12 months to be inserted instead of 18 months. Otherwise the circular was accepted as it stands. This brings us to the position that the sheep breeders who are members have agreed upon a common basis where from to begin work.

Seven important and influential breeders have registered their flocks provisionally pending the examination which will take place in the spring and summer months as soon as the sheep have the required growth of fleeces. Eight highly qualified inspectors have been appointed by the breeders, all the inspectors being gentlemen who themselves are breeders of excellent merinoes, and I have every hope of soon sending you the names and addresses of those who have had their sheep passed into the Stud Book as foundation Stock.

I have already been supplied with some of the flock histories, which prove that this country has flocks of merinos which have been very carefully bred for very many years. Not that this is a new discovery—but it certainly needed making more public, to give that recognition which is due to the persevering breeder who day after day and year after year has been gradually and surely improving his woolled flocks; pegging away amidst good report or evil report. He has been told:—Turn your woolled sheep into fat bastard sheep, raise mutton for the butchers, and you will make more money." But the iron will would not yield, and to-day the country can be proud of its merinos, which fact the Stud Book will reveal in a stronger light than hitherto, because the breeders of these valuable animals have joined hands through the Stud Book to give South African merino sheep a name before the whole world, a name that it is worthy of, but has not before possessed. There is here no desire to condemn the work of the breeder who is crossing his sheep for mutton purposes. He may find this to his best interest and can be trusted to know what is most suitable for his veld and his pocket.

Yet it is a matter for congratulation that there are those who find that breeding high class merinos is also a business that suits them, their pockets and their veld,—to whom it is believed the Stud Book will give such real encouragement as nothing else can.

I am also sending you a circular on the Ostrich. This circular is now in the hands of members to obtain a vote upon the important questions therein raised and collected by means of much correspondence, resolutions at meetings, conversations with breeders and in other ways bringing together, into a more or less concrete form their views in order to get a vote upon them. The decision, I hope to have ready for you next month. There is now no question that there are sufficient Ostrich breeders, who are prepared and willing to register their birds, to form a strong body of breeders in the Ostrich section of the Stud Book, and thereby give this profitable bird a pedigree and a character it has not enjoyed heretofore in any part of the world.

MERINO SHEEP CIRCULAR.

1. Foundation Flocks of Merino Sheep shall be accepted into the Stud Book upon the following conditions:—

2. Any member to have the right to apply for the entry of one foundation flock.

2a. A flock to mean 50 Ewes and 5 Rams.

3. The applicant may support his claim for the entry of a foundation flock by affidavits, and produce a history of his flock to the satisfaction of the Registration Board.

4. Each sheep of the flock to pass one examination.

5. No such examination to be made until the sheep have arrived at the age of 16 months.

6. The period for considering applications for entry of foundation flocks shall terminate on the 31st December, 1907.

7. The progeny of foundation flocks to pass one examination, but such progeny to be, at least, 12 months' old before such examination can be made.

8. An Auxiliary Stud shall be opened for Merino sheep.

9. Wherein sheep shall pass two examinations.

10. The first of these examinations not to be made until the sheep have arrived at the age of 18 months.

11. All sheep passing the two examinations of the Auxiliary Book, may then be transfered permanently to the Stud Book, together with such progeny as may be qualified.

12. No limit is fixed for the number of sheep that may be offered for entry in the Auxiliary Stud Book.

13. Any sheep, whether for entry as foundation flock, or progeny of such, or entry in the Auxiliary Book, must not be carrying a lamb's fleece, nor must the fleece be under 8 months' growth.

14. The Inspectors will always mention in their report, whether a sheep has the appearance of being stall-fed.

15. The Stock Committee who finally adjudicate upon all sheep reported upon, as to whether the sheep passes or not, will be supplied with all information regarding each individual sheep.

16. The owner may report to the Inspector while performing the work of examination, any information he may wish made known to the Stock Committee, other than is provided for in Clause No. 3 of this sheet

17. Or the owner may state in writing any information he may deem necessary regarding his flock to direct the Stock Committee through the Registration Board Secretary.

18. The following Schedule of Points are to be used by the Inspector, which, together with a written report to be submitted to the Stock Committee forwarded through the Registration Board Secretary.

19. *Schedule of Points for Merino sheep.*

	Maximum
1. Head, horns and mouth	5
2. Symmetry	15
3. Size of carcase	15
4. Density of fleece and evenness of covering ...	15
5. Quality of fleece including soundness of serration	10
6. Length and evenness of staple	15
7. Lustre and fluidity of yolk	10
8. Weight of fleece	15

20. It is understood that where two Inspections are required, the same Inspector shall not act on both occasions.

21. Breeders are respectfully asked to keep the left ear of their progeny stock as free from marks as possible, which ear, is to be utilized for Association marks.

22. Any applicant may name his flock.

23. The duplicating of names will be avoided.

OSTRICH CIRCULAR.

1. All ostriches to be entered in the Auxiliary Stud Book.

2. And to pass two examinations before entry in the Stud Book.

3. The first examination to be made at the age when the bird's third plucking is fit for taking off, counting the chick feathers as the first plucking.

4. When the bird will be about two years old.

5. Any deformed bird shall not be eligible for registration.

6. Ostriches offered for registration must be carrying plumage ready for removal or plucking.

7. All ostriches registered shall be numbered for their identification.

8. The Registration Board to appoint officers to be known as "Plucking Witnesses."

9. And also to appoint experts to examine, report on and award points to pluckings of feathers, taken from birds offered for registration.

10. These experts to be qualified, having thorough knowledge of the requirements of the trade, and to be known as "Ostrich Feather Experts."

11. The Registration Board shall be responsible to the owner for the feathers received by their officers.

12. And undertake to return or deliver the feathers so received, after examination, to the owner or his authorized agent.

13. The Registration Board to supply the applicant with an estimated cost of having feathers examined and birds registered, should he, the applicant require such estimate before submitting his birds for registration.

14. The Registration Board shall send the Ostrich Feather Expert's report to the Ostrich Stock Committee for adjudication.

15. The Registration Board to arrange for the Ostrich Feather Experts to meet enabling them to arrange for uniformity in awarding points.

16. The applicant, who is the owner of the ostriches offered for registration, will be expected to pluck the birds in the presence of the "Plucking Witness."

17. To place the necessary brand upon his birds.

18. To pluck for examination the white or femina, two rows of black or drab feathers from each wing and the tail feathers.

19. The applicant to pay all expenses in connection with the "Plucking Witness" the "Ostrich Feather Expert" as well as the insurance and carriage on feathers.

20. The applicant may name any of his ostriches and name the whole of his registered birds as a herd.

21. Which names to be registered.

22. The duplicating of names to be avoided as far as possible.

23. The "Plucking Witness" to receive from the owner, the feathers plucked from each ostrich.

24. Attaching a number to them corresponding to the bird's number.

25. Packing them in a box, sealing the lid at the place where the bird is plucked and where he witnessed the bird being plucked according to rules.

26. The "Plucking Witness" to make a record of the following measurements of every bird offered and plucked for examination.

27. To measure from centre of back (at the highest point) to the knee joint.

28. From the knee-joint to the foot where it rests on the ground.

29. From hip to hip, giving the width of its body at the widest part.

30. From the root of the neck to the root of the tail.

31. The "Plucking Witness" to forward the box containing the feathers, to a place directed by the Registration Board.

32. To whom he reports fully and as early as possible.

33. The "Ostrich Feather Expert" to receive the boxes containing pluckings of Feathers forwarded by the Association's "Plucking Witness."

34. And examine and award points to the feathers of each bird separately.

35. Points to be awarded on the following scale.

Schedule of Points for Plumage.

36. a.	Density combining strength, breadth, richness and uniformity of flue	12
b.	Round full-grown weighty tip	15
c.	Length combining symmetry	16
d.	*Cocks* black with frizzy quality, breadth, length, lustre and must be jet black	15
e.	*Hens* perfectly drab with quality	15
f.	Good tails for quality, with length and breadth	10
g.	*Cocks* prime white with self supporting flue ...	10
h.	*Hens* strong femina with self supporting flue ...	10
i.	*Cocks* number of good primes on each wing with high percentage of good primes	5
j.	*Hens* number of good feminas in each wing, with high percentage of good feminas ...	5
k.	Freedom from bars in the feathers	10
l.	Weight of pluckings, flue well developed at the bottom, and equally long on both sides of the feather	7

37. The "Ostrich Feather Expert" to send report of each bird's plucking to the Registration Board.

38. The following nominal tariff to be allowed to "Plucking Witness" and "Ostrich Feather Expert" 21s. per day for every day engaged and 10s. 6d. for travelling expenses, exclusive of train fares and cab hire.

To Members,

The foregoing provisions are submitted for your consideration and if you have any serious objection to any of the clauses, kindly write me, and at the same time giving your opinion as to how the clauses might be amended. The time having arrived when it is highly important that ostriches should be registered, and seeing that much trouble has been taken to collect the views embodied herein; and further, as the work of the registering proceeds, the clauses could be adjusted to meet requirements, it is therefore necessary that the clauses remain as they are, unless there be any thing which you believe strikes detrimentally at the fundamental principle.

Allow me to add that this circular contains in a concrete form the views and opinions collected through much correspondence and resolutions passed at meetings of those directly interested. But before finally fixing upon any clause, it seems advisable to place this circular before you. If you are not interested in Ostrich farming or if you have no wish to deal with the subject will you be good enough to notify me?

Thanking you for an acknowledgment of the receipt of this letter.

WESTERN PROVINCE AGRICULTURAL SOCIETY.

Revised List of Wine Prizes.

The Western Province Agricultural Society has been busily engaged recently revising its list of Wine Prizes with the happy result that a new schedule has been decided upon, to come into operation next Show, that is calculated to give satisfaction to the majority. It will be noted that the new schedule brings wine prizes into line with the principle adopted by the Western Province Horticultural Board, the prizes being now offered for types of wine. The new schedule was drafted by representatives of the industries interested in conjunction with members of the Committee, and it is to be hoped that the result will be a more imposing array of wines, &c., at the next Rosebank Show. The total value of the prizes offered amounts to £115, against £54 on the old list. In addition, there is a separate class for growers. The schedule is as under :—

SECTION R.—OPEN.

MATURED WINES.

Red Varieties.

For the Best	5	Leaguers	Burgundy Type ...	£5	0	0	
„ „ „	5	„	Claret „ ...	5	0	0	
„ „ „	5	„	Port ...	5	0	0	

White Varieties.

For the Best	5	Leaguers	Sherry Type, Dry	5	0	0	
„ „ „	5	„	„ „ Medium	5	0	0	
„ „ „	5	„	Hock „ ...	5	0	0	
„ „ „	5	„	Sauterne „ ...	5	0	0	
„ „ „	Collection of Sweet Wines—4 varieties, viz., Red and White Muscadel, Hanepoot, and Pontac. Each variety to represent not less than 5 Leaguers			10	0	0	
							£45 0 0

BRANDIES AND SPIRITS.

For the Best 5 Leaguers Dop. Not less than 15 per cent. u.p. Sykes	5	0	0			
For the Best 5 Leaguers Brandy, Cognac Type. Not less than 25 per cent. u.p.	10	0	0			
For the Best 5 Leaguers Liqueur Brandy. Not less than 25 per cent. u.p. ..	5	0	0			
For the Best 5 Leaguers Pure Spirits of Wine, distilled at strength of 38 per cent. o.p. to 42 per cent. o.p. ...	5	0	0			
For the Best 5 Leaguers Pure Spirits of Wine, distilled at strength of 58 per cent. o.p. to 62 per cent. o.p. Sykes ...	5	0	0			
For the Best 5 Leaguers Pure Spirits of Wine, distilled at strength of 65 per cent. o.p. and over, Sykes ...	10	0	0			
				40	0	0

LIQUEURS.

For the Best 60 Gallons Van der Hum ...	5	0	0			
For the Best 60 Gallons Orange ...	5	0	0			
For the Best Collection representing 1 Hhd. each of Ginger, Anisette, Peppermint, and Clove	5	0	0			
				15	0	0

SUNDRIES.

For the Best Leaguer Pure Wine Vinegar	5	0	0			
For the Best Assortment Aerated Waters...	10	0	0			
				15	0	0
				£115	0	0

SECTION R.—OPEN TO BONA-FIDE GROWERS ONLY.

DRY RED WINES OF VINTAGE 1905.

For the Best 5 Leaguers Pure Pontac .	£5	0	0			
„ „ „ 5 „ Red Muscadel ...	5	0	0			
„ „ „ 5 „ Port Type ...	5	0	0			
„ „ „ 5 „ Burgundy Type ...	5	0	0			
„ „ „ 5 „ Claret Type ...	5	0	0			
				25	0	0

Dry White Wines of Vintage 1905.

For the Best 5 Leaguers Sherry Type ...	5 0 0	
„ „ „ 5 „ Sauterne Type ...	5 0 0	
„ „ „ 5 „ Hock Type ...	5 0 0	
		15 0 0

Sweet Wines of Vintage 1905.

For Best 5 Leaguers natural White Wine	5 0 0	
„ „ 5 Leaguers natural Red „	5 0 0	
„ „ 5 Leaguers Red Muscadel Geripeico	5 0 0	
„ „ 5 Leaguers White Muscadel Geripeico	5 0 0	
		20 0 0
		£60 0 0

Brandies of Vintage 1905.

For Best Leaguer Dop Brandy, not less than 10 per cent. u.p. Sykes	5 0 0	
„ „ Leaguer Pure Wine Brandy ..	10 0 0	

Natural Matured Brandies of any Vintage.

For the Best Leaguer Old Dop Brandy, not less than 15 per cent. u.p.	5 0 0	
„ „ „ Leaguer Pure Wine Brandy (Vintage 1905), not less than 15 per cent. u.p. ...	10 0 0	
		30 0 0
		£90 0 0

COMMON SALT, SULPHUR, LIME, AND TAR.

Their Uses for Farm Stock.

By D. HUTCHEON, M.R.C.V.S., Acting Director of Agriculture.

COMMON SALT.

With respect to common salt, or chloride of sodium, as it is called, it is the most widely distributed, and is present in larger amount than any other salt in all the tissues of the animal body. It is absolutely essential to healthy nutrition; but common salt, in addition to being an essential constituent of the blood and tissues of the animal body, greatly aids the digestion and assimilation of the organic constituents of the food. The free hydrochloric acid of the gastric juice, and the soda of the bile, are obtained from common salt, while its beneficial effects as a preventive of internal animal parasites are recognised by all intelligent stock farmers. There is very little danger of giving too much salt to stock, unless it is given to them in large quantities, at long intervals. The most profitable and satisfactory manner of giving salt to sheep or other stock is to place it in some convenient and suitable situation where they can have free access to it at all times. Under such conditions the stock will regulate the quantity which they lick to the requirements of the system. No definite rule as to quantity can be laid down, as it entirely depends upon the greater or lesser amount of saline matter in the vegetation and water of the farm. The only satisfactory method is to keep it constantly within reach of the stock.

For stall-fed stock, large cattle two ounces daily, horses about the same quantity. Young stock and medium-sized animals one ounce. Sheep and goats a full teaspoonful. Pigs about half that quantity.

Salt added to the food of ruminants is said to impart consistency to the fat, and renders the meat more palatable and wholesome.

Medicinally, common salt in large doses is purgative. But when given in very large doses, and in concentrated solutions, it is a violent irritant, causing great pain to the animal and intense inflammation of the stomach and intestines.

SULPHUR.

With respect to sulphur, a little mixed with the salt is very beneficial to sheep. Wool contains about 5 per cent. of sulphur, hence it is not merely a healthy medicinal adjunct, but an essential constituent of the food of a fleeced animal, such as sheep and goats. It is best given in small quantities and continuously. When a single large dose of sulphur is given, it acts as a purgative, a considerable quantity passing out with the fœces unchanged; but when given in small and repeated doses it is mainly converted into sulphides and sulphuretted hydrogen, which permeate the whole system, passing out by the breath, urine, and skin, and favouring the growth of wool. Its beneficial action on birds, such as ostriches and poultry is equally well known. All experienced ostrich farmers and poultry keepers know the value of providing their birds with a mixture of sulphur and ashes or dry earth to roll in as a preventive of external skin parasites, but it is beginning to be equally well recognised that repeated doses of sulphur are of great benefit to birds when moulting, greatly promoting the growth and quality of the new plumage. But in addition to its value as an adjunct to the ordinary food, the curative action of sulphur on parasitic skin diseases when given internally, has been known and popularly recognised for generations, and instances of its beneficial use in the cure of scab in sheep and goats, have been frequently referred to. The explanation of its action is as follows :—When sulphur is taken internally, it is absorbed into the system, a large portion of it passes out by the bowels while part is eliminated by the kidneys in the form of sulphuret or sulphate of soda. It is exhaled by the breath and may give to it the peculiar disagreeable odour of rotten eggs. It is also excreted by the skin in the form of sulphuretted hydrogen and sulphurous acid. It is these gases passing out through the skin that kill the animal parasites living on its surface.

I am aware that many farmers are afraid to administer sulphur to their stock for fear that they should afterwards suffer from exposure to cold weather, as it is a general belief that one of its effects is to open the pores of the skin, rendering the animals very susceptible to cold. But this fear is very much exaggerated. As already stated the sulphur compounds pass through the secretory glands of the skin, and stimulate them to increased action during their passage, but do not *open* the pores of the skin in the sense in which farmers understand it; nor do they render the animal perceptibly more susceptible to cold than natural.

Sulphur is obtained from the gypsum or native sulphate of lime in the soil by the plants from which the stock get it into their food; and although the majority of soils may contain a sufficient quantity of sulphur available in this form, the fact that sulphur forms such a large percentage of the constituents of wool, hair and feathers clearly indicates that a little added to the salt-lick will foster the growth of these skin coverings in addition to its many valuable medicinal virtues.

LIME.

Lime Salts are essential ingredients in the food of animals for the healthy development of the solidity of the bones. A number of careful investigators have repeatedly shewn that the bones of animals become poor in earthy salts and by consequence thin, they may even become soft and pliable, when the deficiency of lime is great, manifested by the appearance of Rickets in young animals and Lamziekte and Stijfziekte in older animals.

The latter two diseases are due not so much to the absence of lime, as a special salt of lime, *the phosphate.* There are many farms in the Karroo and other situations where lime salts are over-abundant; lime as a lick would be manifestly out of place on such farms, but on all sour grass veld, the salts of lime are generally deficient, and a little added to the lick given to the stock would be of much benefit to the healthy nutrition of the flocks.

TAR.

Stockholm tar is the product of a crude distillation of the resinous wood of the pine. The tar thus obtained contains a considerable admixture of resin and turpentine.

Medicinal uses.—Tar exercises a stimulating and cleansing action in the mucous membrane of the stomach and bowels, and has considerable effect in cleaning out the stomach wire worms of sheep, when given in full doses and repeated. It also acts as a stimulant to the kidneys due to the turpentine and resin which it contains. It thus assists in removing the dropsical condition which is generally associated with the presence of these and other worms. It is largely and beneficially used as a cleansing and healing dressing for the mouth in malarial catarrhal fever of sheep, and other inflammatory affections of the mouth. Externally it makes an excellent dressing for wounds, and diseases of the feet such as Foot-rot, the diseased frogs of horses. Mixed with fat it makes an excellent emollient dressing to the swellings in "strangles," or abscesses in other situations, in which it is difficult to apply a poultice.

Doses.—A tablespoonful may be given a full-grown sheep and four or more to cattle.

CATTLE DIPPING AND DIPS.

Bathurst Experiences

At the July meeting of the Bathurst Farmers' and Fruit Growers' Association the matter of dipping was discussed for over an hour, shewing that the members realise more than ever the importance of the movement, and the great rise in land values likely to happen in a year or two Hayward's Dip had now been used some nine times, simply by adding more dip and more water every time the tank got low. It killed the ticks on cattle, and its behaviour on sheep (Persians and halfbred), left nothing to be desired. The attendant (H. Dagmore), before handing in his report, said he had been told that all the arsenic contained in Hayward's Dip settled at the bottom of the tank, and that some day—it was said—there would be an accident. He thought that as we were getting on so famously with "Hayward's", it would be as well to see whether or not this was the case. We were all in the dark, and he thought we should go slowly.

The Chairman pointed out that that was exactly what was wanted in a dip. If a dip would kill all the ticks, and get stronger and stronger as the months went by, there was no doubt in his mind that we had "struck oil" because by the addition of more water periodically we still had an effective dip.

ATTENDANT'S REPORT (ABBREVIATED).

Dipping has been brisk and results generally satisfactory. I anticipate with warmer weather, and ticks to be killed, that dipping will be as popular as it was the day we opened the tank. At the same time I think it my duty to sound a note of warning, as we are using Hayward's Paste Dip in the proportion of 1 in 80, and the instructions distinctly state that 1 in 100 is the strongest that should be used, and 1 in 120 generally recommended for scabby sheep. There seems, therefore, an element of danger in arranging our dip to kill the large adult (engorged) ticks. Would it not be better to confine our attention to killing the small ones only, which could be done with a much weaker solution? The effect on cattle (oxen), of the 1 in 80 weakens them for one or two days, although they shew a marked improvement within a week. "From careful observation I believe we are risking much by putting small stock through at this strength, my own sheep not recovering from the effects for nearly a weak. In fact my last dipping resulted in the death of two thickly woolled sheep (my own) and the whole flock looked miserable for over a week. They were dipped in fine weather, therefore if wet weather had ensued the loss would have been probably much heavier. " He would suggest that sheep should not be put through until the dip is reduced to 1 in 100.

In cross-questioning it was shewn that Mr. Henry Dugmore (the attendant) and Mr. J. Bradfield had both bought the same class of sheep on the same day on the Grahamstown Stock Fair. Mr. Bradfield had not dipped, and had yet lost two out of a small flock of 20. Mr. Dugmore lost two out of 135 from the same cause which was not dipping, but something they had eaten on the road to the two farms. The attendant's practical suggestions were met by a proposition of Mr. C. J. Ansley, seconded by Mr. Joseph Dugmore and carried :—" That in future Mondays shall be reserved for cattle and water added on the Tuesdays to make the required strength for small stock."

A motion Bradfield—Richardson. That a sample of the dip in the tank at the end of every alternate dipping shall be taken out and analysed at the cost of the Association, the Secretary to notify Messrs. Hayward Young & Co, and the Government to this effect and ascertain the cost of same. Carried.

The Chairman in summing up the remainder of the discussion dwelt on the fact that the coast lands will be found yet to be the most valuable asset in the Colony. Sheep are now thriving where less than two years ago it was impossible to keep them. We are growing millions of pineapples. Hundreds and thousands of deciduous and citrus trees have been planted, the true value of which will appear later, and in addition to all this, cattle are going well and we are supplying the other parts of the Colony with ordinary farm crops. Ostrich farmers were all smiling, and he advised them all to sit tight and steadily develop.

DIPPING-TANK DEBT

The notice of motion by Mr. Gray, in the absence of the mover was elucidated by the Chairman, and the resolution originating from the discussion, by Messrs. Ansley—Smailes reads :—That Mr. Henry Dugmore be authorised to receive voluntary subscriptions of not less than £1 sterling from all members and farmers. That as soon as the amount of the debt has been met in this manner, all those who have so subscribed, shall have their cattle dipped at half-price; that the amount so subscribed shall be considered as payment for dipping at the reduced rate, and the full rate of 3d per head shall in future only be paid by those who have not subscribed to clear the Association from debt. Carried. The Chairman pointed out that if those members who feared to attend a meeting in case a subscription should be levied, would contrast their behaviour with the attitude taken up by Mr. C. J. Ansley, they would better understand what was conveyed by the word " gentleman " if they ever saw it in print again.—*Journal.*

SPRAYING vs. DIPPING.

The Douglass Contentions

By the Hon. Arthur Douglass

I read with considerable amusement in your last issue Mr. Llewellyn J. Roberts's criticisms on a speech by myself on the above subject at the Agricultural Union's meeting, and on a paper read by my son to the Koonap Farmers' Association, and if it were not for the mischief that might be done to the cause of tick eradication I should not trouble to answer his remarks.

Unfortunately it is not the first time that Mr. Roberts has done considerable harm to the cause of tick eradication by publishing surmises as ascertained facts. Mr. Roberts will remember, shortly after I made known the marvellous effects of paraffine as an instant destroyer of all ticks when sprayed on cattle, he published as a fact that he had proved that Cooper's sheep dip with soft soap added was equally effectual. Knowing from numerous experiments that this was absolutely erroneous, that, even if used to strengths that did serious injury to the cattle, it was still harmless to the mature Bont ticks, I sounded a warning note, and Mr. Lounsbury the Government Entomologist went up to Mr. Roberts's farm, stayed there several weeks conducting experiments on Mr. Roberts's lines in conjunction with Mr. Roberts, but finally had to abandon it as an utter failure in the destruction of mature Bont Ticks, and the only conclusion one could come to was that Mr. Roberts had dreamt he killed the ticks instead of examining the cattle, when he would at once have seen them alive and healthy. But great mischief had already been done. On one occasion I was at the sale of a very progressive farmer's stock and I remarked to the Scab Inspector of the district, what a disgrace it was to see cattle in such a state, the heifers with half their speens gone and the whole herd one mass of ticks, when I had demonstrated what a simple matter it was to destroy the ticks with a paraffine spray. But the Scab Inspector said "I am afraid I am to blame for this. Just before I started on my last round of inspection, I had read Mr. Roberts's statement about Cooper's sheep dip and soft soap being quite as effective as paraffine and much cheaper, and I made it my duty to urge every farmer I visited to go in for it. Unfortunately this farmer did so, with the fatal results we see."

Surely Mr. Roberts should have learnt a lesson to be more careful about publishing, as facts, mere surmises.

Thanks to the splendid services of Mr. Lounsbury, we know fairly well the life history of most of our tick enemies, and it is extraordinary to see Mr. Roberts in his criticism confounding the female Blue tick with the female Bont tick. The Blue tick remains on the animal to change its skins and can presumably be destroyed in its larval or nymph stages by fortnightly dipping of the cattle. But the life cycle of the Bont tick is totally different, it leaves its host after feeding on it for three or four days in both its larval and nymph stages and hence the impossibility of ever destroying more than a small portion of them at these stages by fortnightly dippings.

Further it is admitted by every one with experience that no dip has been discovered that will kill the adult female Bont tick, so that the Bont tick cannot be effectually dealt with at any stage in its life cycle, by fortnightly dippings. The only thing yet discovered that can cope with the female Bont tick is paraffine sprayed on with some force, either pure or mechanically mixed with water in specially constructed pumps.

The reason of the failure of all the dips to kill the female Bont tick is, I believe, that they all have arsenic as their active ingredient, and the arsenic acts not through the skin of the tick, but by the tick sucking in the arsenic with the juices of the beast's skin it is living on. But the female Bont tick, different to the male, pierces through the beast's skin and sucks blood which the arsenic has never reached, and so takes in no poison. Whilst the paraffine sprayed on goes through the skin of the tick and instantly kills it.

But say some of Mr. Roberts's stamp who do not go thoroughly into the matter, "Oh! by dipping once a fortnight we catch them in the larval and nymph stage and so never let them become adults." Do they? Let us see. Let us suppose a beast dipped on the 1st of the month. On the 3rd the effects have worn off enough to allow larval Bont ticks to live on it, and a number get on, and after four days' feeding drop off and in due course become nymphs. The same on the 4th and up to the 11th, from the 11th up to the 15th all those that get on will be killed by the fortnightly dipping on the 15th; but all those that get on in the eight days between the 3rd and 11th will have dropped off again and so escape the dipping. The same thing will happen in the nymph stage; all those that get on a beast for eight days out of the fifteen will escape the fortnightly dipping, so that rather more than half of the larvæ that hatch and get on to the beast will become adult ticks, so far as any effect the dipping will have on them; and it is acknowledged by all men of experience that no dip has been discovered that will kill the adult female Bont tick, and consequently no veld can be cleared by any dip yet discovered.

I have heard some say: "This is all quite true as regards the female Bont tick, but by dipping we kill the males; so the females do not get impregnated."

Is this so? Take again a beast dipped on the 1st. On the 3rd adult bont ticks get on it; for about three days the males will not mate, so this would make it the 6th or 7th before copulation began, but it would go on to the 15th, the day of the fortnightly dipping, by which time, or even several days before, the female is sufficiently impregnated to produce an enormous quantity of fertile eggs. So that we see that dipping, with a dip that will not kill the adult females, can never be effectual.

But the spraying with paraffine is admitted by everybody to be almost instantaneous death to all ticks, including both adult male and female Bont ticks, and it is the only thing yet discovered that will do this. And by spraying every fourteenth day no mature tick escapes and no more eggs are laid. In spraying it is not necessary to spray the whole beast, only those parts that the adult ticks infest need be sprayed, the larvæ and nymphs can be ignored, they will never reach a stage to hand down progeny.

Mr. Roberts remarks on this being the seventh year that I have sprayed. Yes! I still have to spray in the summer, and as long as spraying does not become general I shall have to spray occasionally in the summer. Only last month at Heatherton, on a boundary with a neighbour who does not spray, I shot a very old bushbuck. It was covered with ticks, and on one small mangy patch on a hind leg I counted seventeen pairs of adult Bont ticks. This alone would be enough to give me another year or two's spraying, and no doubt it was only one of several similar bucks. But if the profits of my other farming operations were only half as great as the profits on the money spent on spraying my cattle, the proverbial millionaire's fortune would be mine now.

If ever a dip is discovered that will do either one of the three following things, *i.e.*, kill adult female Bont ticks; or protect a beast from a larva or nymph being able to live on it for eleven days after dipping, so that the fortnightly dipping would catch all that get on; or that would protect the cattle for three or four days, and whilst being deadly to the larvæ and nymphs, would be innocuous to the cattle, so that they could be dipped weekly—then, but not till then, dipping might possibly supersede spraying. But till that is discovered, I can only advise my brother farmers to do as so many are now doing—drop all idea of dipping, and spray regularly every fortnight with the syphon pump, and they will never regret it.

Mr. A. W. Douglass also Replies.

When I read my paper on the subject of "Dipping *vs.* Spraying," I asked for criticism, and I was glad to see Mr. Roberts take up the cudgels; but I should again like to emphasize one or two points, and also criticise Mr. Roberts's figures and theories. In the first place, it is a very open question if dipping has come to stay, and Mr. Roberts is altogether wrong when he states that dipping has superseded spraying on almost every farm except Heatherton; but I think I am nearer the mark that, for every farmer who dips his cattle regularly, there are fifty who spray them. The great cry that was raised about a year ago of "Build dipping tanks and dip your cattle," is fast disappearing, and we very seldom hear now of a new dipping tank being built, while a number of the tanks that were built are now lying idle. On the other hand, spraying is greatly on the increase; and the pumps cannot be supplied quickly enough.

Mr. Roberts knows perfectly well there is no need to wet the animal from the tip to tail, as the ticks and especially the female ticks only get on certain parts of the animal (the underneath parts). You can wet every tick by dipping your cattle in water but whether you kill every tick because you wet it, is a very different thing. A beginner in spraying who has cattle that are not used to it will do from 60 to 70 head an hour; but with boys that are used to the work, and cattle that have been often put through a race, 120 to 130 can be done in the hour. If 750 were put through a dip in an hour or 120 in 11 minutes as Mr. Roberts states, then, I am certain, very few of those ticks were killed. The excuse was, when, at the opening of the Grahamstown Municipal Tank, no ticks were killed, that the cattle had been put through too quickly and yet nothing like a hundred (100) were put through in an hour. I think Mr. Roberts is again very much out of it when he comes to the cost. I should like to ask Mr. Roberts how it is that if the cost of dipping is as he says 3s. per hundred why do all the Mutual Dipping tanks charge 3d. per beast or 25s. per hundred? And yet we hear that they are finding them rather a white elephant from a financial point of view, whereas according to Mr. Roberts they ought to be splendid dividend paying concerns. I was not able to get the number of cattle that have been put through the Grahamstown Tank since it was opened six months ago, but I don't think it is as many as two or three hundred; and yet it is erected in a central position, where thousands of cattle are passing through each month. I think the Council would gladly sell it at cost price or under, but I would be sorry for the buyer, if he had to make a living out of it at even £1 per hundred when the cost ought to be 3s. as Mr. Roberts asserts. But to make the cost a little clearer, taking Mr. Roberts' figures to clear Heatherton of ticks which is roughly 8,000 (eight thousand) morgen at £735 less ⅓ which allows for the four winter months when no spraying is done, we get a cost of £500 or £1 per head. Now the average farmer has say 2,000 morgen of ground and about 125 head of cattle. This I think is a fair average. He will then be able to clean his farm, by spraying at a cost of say £125, to say nothing of the improvement to his stock.

Now where does the cheapness of dipping come in? As it would cost that man £100 to £125 to erect the dipping tank etc., alone, before he had ever killed a tick. The chief point I want to emphasise is this: that we must kill every female tick to clear our farms.

Now there is no dip yet discovered that will do this, but spraying with paraffine will. The larvæ and nymphs, that is to say the young ticks, only remain on a beast from four to five days before they drop off to go through their life's course. Now if the dipping will kill the young ones, yet we only get one-third of them and no females, so that the most a farmer can do by dipping is to kill a small proportion of his ticks.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome

Questions are also invited In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible

All letters or contributions should be plainly addressed "The Editor of the *Agricultural Journal* Department of Agriculture, Capetown," they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication

Wire and Tape Worms in Stock.

To the Editor, AGRICULTURAL JOURNAL

SIR,—With reference to your remarks in your notes regarding above a change to clean veld with a good supply of rock salt will work wonders Our factory manufactures two remedies, 'Hayward's Specific for Worms,' in half gallon drums, a considerable quantity of which we have sold through merchants in various parts of the Colony, and Hayward's Sheep Lick, in 7 lb. and larger sized drums the demand for which has come chiefly from the high veld

Neither of these remedies has been advertised in South Africa but if any farmer would like particulars we shall be pleased to supply giving name of nearest storekeeper who stocks it —Yours &c

HAYWARD YOUNG & CO

Port Elizabeth Aug 4

Copper Sulphate Mixed with Salt

To the Editor, AGRICULTURAL JOURNAL

SIR,—In the *Agricultural Journal*, No 1 Vol XXVII you wrote as follows — One of the most common difficulties our Stock farmers have to contend with is that of internal parasites

I quite agree with you And I know of several farmers who, in the years 1894 and 1895 lost nearly all their sheep through these pests I myself lost a good many sheep in 1894 through Wire worms I then had recourse to the mixture of Copper Sulphate and Water prepared according to the formula prescribed by our Chief Veterinary Surgeon But the consequence was a loss of about 35 or 40 sheep by choking out of a flock of 1 800

The remainder of the sheep then improved in condition and seemed to do well until the next summer when they were again suffering from Wire worms, and mortality set in again I was about using the Copper Sulphate mixture again but, being convinced that a number of sheep would succumb again by choking, I hit upon another plan which proved more successful I mixed the Copper Sulphate with salt and gave it to my sheep as a lick There was then no more mortality, the sheep began to grow, up to now I have not lost a single one, and they are in perfect health I have used the above Mixture of Copper Sulphate and Salt for the last ten years, and have not dosed any of my lambs for tapeworm during the last four years, the Copper-sulphate Salt mixture being sufficient to eradicate the pest

I give my sheep this mixture during the summer months, from September to the end of March or April, in the morning before they go out to graze, once every eight or nine days. The mixture consists of 1 (one) lb. of finely-powdered Copper Sulphate and 40 lbs. of Salt, thoroughly mixed. This quantity is sufficient for 1,000 sheep. After they have taken the mixture they are allowed to go to the veld and to drink.

Last year I gave it to my ewes before lambing; and when the lambing season set in they had plenty of milk, although the veld was very dry.

Hoping my fellow-stock-farmers may derive some benefit from the above treatment,—Yours, etc.,

O. A. GREYLING.

Andover, District Wodehouse, July 28th, 1905.

Extra Tropical Forestry.

To the Editor AGRICULTURAL JOURNAL.

SIR,—I have followed with interest the various articles by Mr. Hutchins on the above subject which are sure to prove instructive to tree planters in various portions of South Africa.

But, I think, in your July number the Conservator of Forests deals somewhat abruptly with Bechuanaland, opining that the country is too dry to produce high timber forest. It is interesting at this point to observe that Mr. Legat, the Conservator of Forests of the Transvaal, expressed himself as being delighted with the progress made at the yet young experimental station at Lichtenburg, which lies as high and dry as the part of the country in which I am at present engaged in tree planting.

I think I have been here long enough to warmly endorse Mr. Hutchins's suggestion that a small experimental plantation be established near by "to shew the way for larger work or to prove that Bechuanaland is outside the rainfall zone of profitable tree planting"

I should say that an ideal spot for just such a plantation might be found along the banks of the Molopo River, where in one place particularly there is plenty of excellent subsoil.

Re the most profitable trees to plant, I should say that if the common European Oak (*Pedunculata*) flourishes so well at Vereeniging (according to Mr. Hutchins's personal observation), alike with many of the hardier, valuable Eucalypts already growing here and that in a place where scanty summer rains, heavy frosts, and drought reappear annually, I should say that these trees of commercial value could be extensively cultivated in the Bechuanaland Protectorate.

Last year we were suffering from severe drought and termites, followed by a sharp winter with freezing point in the forcing house and as much as (frequently) 17 and 20 degrees of frost in the open, yet out of the thousands of trees in camp and town, *Eucalyptus corynocalyx* has been the only one species nipped—not killed—by the heavy frosts and sudden changes in atmospheric conditions.

Judging from personal experience the various Poplars, Native Syringa and other leaf shedders, as well as Black Wattle, Beefwood, Cypress, *Eucalyptus Gunnii*, *E. tereticornis*, *E. rostrata*, *E. viminalis*, *E. polyanthemus* are thriving firstrate. Last but not least, *Grevillea robusta*, a splendid-growing, hardy and useful timber tree, which should be extensively planted as it seems to thrive in all classes of soil. Of course, our *Schinus molle* (Pepper tree) for shade and rapid growth stands at the head of the list.

And I further think that *E. microtheca* and Elm are two trees suitable to this climate. We hear of Knysna giving out—we yet require millions of railway sleepers and *E. microtheca* should be tried wherever possible. The nursery I superintend here is as yet too young to show definite results *re* the last named varieties.

There have been of late numerous applications for all kinds of trees from neighbouring farmers and persons, desirous to plant such on farm or round the homestead, a very encouraging sign indeed.

The country for miles around is being ruthlessly denuded of its indigenous trees, M'pani and Acacia giraffæ being principally sought after for firewood.

Mr. Hutchins further informs us that around Vryburg, only some 70 miles from here, *E. globulus* (Bluegum) was growing well about the time of his visit, whilst here the same tree is or seems utterly out of place.

Experiments in "American" Cotton here have proved a great success and the Government would do well to carefully consider the matter of cultivation of the same on a large scale.

It seems the Conservator of Forests has not paid us a visit for some years. To such a visit we would look forward with the keenest interest. It is surprising that so many Eucalypts, which were severely handled and "topped" during the siege months are now growing more beautiful than ever, in addition to the fact that little or no attention as to watering them, &c., has been bestowed upon them during that period.

I sincerely trust the Government will establish at as early a date as possible an experimental station in this locality, as somehow I feel that with convict labour thrown into it, the scheme will in due time turn out and prove itself to be an encouraging, financial asset and success.—Yours, &c.

A.E H.

Mafeking, July 15, 1905.

Rare Trees in South Africa.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In your last *Journal* I notice Mr. A. D. Campbell of Komgha says he has not seen the Money Puzzle tree in South Africa. I have a fine one growing in my garden. It stands between 30 and 40 feet and has been growing for the last 30 years or more. My son, who is at St. Andrew's College, Grahamstown, tells me there is a very fine one in the Botanic Gardens in that town

I have also a very fine tree which, I believe, is very rare in this country, the Wellingtonia of California. It is about 60 feet high and a very handsome tree.—Yours, etc.

WM. FROST.

Tarkastad, July 20.

Lamziekte Preventives.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—The following preventive for Lamziekte in cattle was recently handed to me by a local farmer :—1 bag ground salt: ½ bag bone meal; 10 lbs. sulphur; 10 lbs. saltpetre ; 5 gals. Stockholm tar; 5 lcs of powdered aloes. The above to be well mixed together and placed in crib as a lick.

I am a firm believer in the efficacy of bone meal as a preventive of lamziekte and use a considerable quantity of it mixed with salt, in the proportion of one of bone meal to three of salt; and I can understand that the addition of a certain amount of sulphur might be beneficial, but I am not clear as to what would be gained by the addition of the saltpetre, tar, and aloes. Can you, through the medium of the *Agricultural Journal*, enlighten me as to whether the preventive effect of this bone meal and salt is in any way increased by the addition of the other four ingredients.

I have tried bone ash instead of raw bone meal, but find that it is difficult to get cattle to take it, though they take to the bone meal greedily.

Perhaps some of the readers of the *Agricultural Journal* may know of some means by which stock may be got to take the burnt bone. I have tried mixing it with other things, but have not found anything quite satisfactory yet. My last experiment was a mixture of bone ash, salt and some rather high smelling mealie meal (one of bone meal, four of salt and two of mealie meal) and to this mixture the cattle took fairly well, but not nearly so well as the raw bone meal and salt. The advantage of the bone ash is that one does away with the risk of infecting the stock with other diseases, and the burnt bone is easily ground or powdered, whilst the raw bone is very difficult to grind fine and buying sterilized bone meal at the coast and having to pay railway carriage and transport charges up to this part of the country is rather an expensive business; and the unfortunate farmers in Griqualand West are not in a position just now to add to their expenses, as for the last three years most of them have been farming on their capital.

I shall be glad if you or any reader of the *Agricultural Journal* can suggest any ingredient to be mixed with bone ash to make it palatable to stock, as there are bones enough on most of the farms about this district, if reduced to ash, to supply farmers for a considerable time to come.—Yours, etc.

FRANK ORPEN.

St. Clair, Douglas, July 31.

The bone meal and common salt are the essential ingredients in the above mixture Small doses of sulphur are an excellent alterative, more especially in skin diseases, but as an additional food constituent it is more required in fleeced and feathered animals than in cattle, as wool hair, and feathers contain a large percentage of sulphur It would exercise a beneficial effect upon the health of the animal generally, but I do not think that it would exercise any special effect in preventing Lamziekte or Stijfziekte Similar remarks apply to saltpetre—nitrate of potash, besides on some varieties of veld, where Lamziekte is prevalent, there does not appear to be any deficiency in potash salts Stockholm tar exercises a stimulating and cleansing effect on the mucous membrane of the stomach and bowels But otherwise I do not consider that it would exercise any direct preventive effect against Lamziekte With respect to aloes. In large doses it is a well known purgative In smaller doses it is a bitter tonic, slightly stimulating the action of the bowels, and would thus act beneficially when veld is dry, and the available food rather indigestible and tending to constipation I am of opinion, however that a liberal supply of good common salt given along with bone meal meets all these requirements It greatly aids the digestion and assimilation of the organic constituents of the food, it increases the thirst, and thus tends to increase the action of the bowels (See article on "Common Salt, Sulphur, Lime, and Tar," in this issue)—D HUTCHEON, Acting Director of Agriculture

The Smyrna Fig

To the Editor, AGRICULTURAL JOURNAL

SIR,—I enclose a cutting from "*Gleanings in Bee Culture* I think you will decide that the whole article is worth reproduction, and will prove interesting to readers of your valuable *Journal* but I wish to draw particular attention to the references therein made to the Chalcid Fly and the Smyrna Fig As I own several trees of this variety, and as it is my favourite fig, I have been trying to find out for the last couple of years why it is that the Smyrna fig is such a failure most of the time As most orchardists know, this fig is, generally, either a total failure or only half of the fig develops into edible fruit And I finally came to the conclusion that it had to do with some insect, either harmful or beneficial—either the former in which case the insect injures the fruit or the latter, in which case it would probably be a necessary agent in the fertilization of the fruit Last season I tried netting a tree The result of this was that the fruit was an absolute failure This proved to me that the failure of the fruit could not be due to an injurious outside agent, but to a very necessary beneficial agent And I concluded that it had to do with the fertilization of the fruit The worst of this was that I saw no prospect of remedying this defect, and I decided to work these trees to some other variety But here from an unexpected source the whole thing is explained, and I find that the enterprising Americans had long ago solved the problem through their fatherly Agricultural Department This gave me new hope Surely *our* Department will not be less fatherly, but will take steps to procure this very useful little fly for the use of our Cape orchards, unless it is already an habitue of some portion of our country, in which case I should be glad to hear of it Trusting that you will give this matter a place, and that it will lead to fruitful Smyrna trees in our orchards,—Yours, &c,

F J HAARHOFF.

Pienaar's River, Graaff Reinet

The following is the reference enclosed —

"THE BLASTOPHAGA

"I wonder if it is generally known what a blessing we have in a little chalcid fly, which is brought all the way from Persia It is a very minute insect, and is often referred to as the fig-wasp As we all know, the Smyrna fig has rare excellence While we have just the right climate and soil for fig production, we have until lately utterly ailed in producing the Smyrna figs It was found that in Smyrna these figs could not be produced without the little fly, and that these flies bred only in another kind of fig, the Capri fig At the proper time branches of the Capri fig were hung in the Smyrna trees. Through the kindly office of our splendid Department of Agriculture, these *blastophaga* were introduced into the fig-orchards of our State, and to-day we are producing Smyrna figs which are unexcelled in amount of production and excellence of quality Here again then, we have an example where the importation of a tiny insect has led to great economic results"

This matter has been having attention for some time past by the Government Entomologist, but, like many more of the same nature, it takes time to accomplish. The first step is the introduction of the wild fig of Capri, which is absolutely essential for the propagation of the *blastophaga*. Trees of this kind were introduced by the Department of Agriculture several years ago, and planted out on various farms—some being situated near Grahamstown. As soon as these trees are fruiting abundantly, attempts will be made to introduce the insect in question. At the same time, the Department is taking steps to extend the plantations of the true Smyrna and other figs now grown, and which require the insect for the purposes of fertilisation. If our correspondent has a place on his farm where Capri figs would grow into dense bushes, the Government Entomologist would be pleased to get into communication with him with a view to supplying him with the necessary cuttings to start a plantation.—EDITOR, *Agricultural Journal.*

Prickly Pear.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—With reference to your note on "Kaalblad" Prickly Pear, I would like to ask whether it will not be possible to procure some such plants of the new spineless variety now propagated in California, U.S A , which variety I understand is absolutely spineless, and ought to be a great boon to this Colony ?

Could it not be procured through our Department of Agriculture ?

I planted a lot of of the "Kaalblad" (so called), but it is a misnomer, as it still contains enough spines to make it troublesome, although it is a great help in time of drought or winter.—Yours &c ,

GID. F. JOUBERT.

Welbedacht, Lady Grey, A.N., July 19th, 1905

Orange and Pine Trees.

To the Editor, AGRICULTURAL JOURNAL

SIR,—I should be glad to receive some information regarding my trees as under.

I have a row of orange trees in my garden, and about ten yards from them there is a row of pines, "Rock" and "Insignis," which were planted as a wind-break. I have been informed that in time the pine trees will send out roots, and eventually kill the orange trees. I should like to know if this is likely to be the case, and, if by digging a deep furrow between the rows (say four feet deep), I could prevent the roots from running in that direction.—Yours, &c ,

ANDREW COATS.

Stutterheim, July 31.

Thirty feet seems a fairly safe distance, and there should be little cause for anxiety.

The Farmer's Life.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I see in your issue of this month, an enquiry, by "Constant Reader, " *re* above subject, and after having stated all his qualifications, etc., in that line, he is anxious to know (evidently from experienced farmers) whether he has a chance of making a living in that profession.

Well, Mr. Editor, his capabilities are all very good for the farming line, *except the last*, for farming in South Africa at present is one of, if not the most scientific profession going, and the practical farmer requires all his time, for after his day's work is done, he has to attend to his office work, read his papers and do all his correspondence, etc , and last of all to enable him to uphold a responsible and lasting administration, he has to make all his plans and calculations for the following day, and I am afraid that the effects of the whiskey might reverse the engine.—Yours, &c ,

EXPERIENCED FARMER.

Richmond, 4th August, 1905.

Failure of Salt Bush Seed.

To the Editor, AGRICULTURAL JOURNAL

SIR,—With reference to Mr Grewar's letter, in your last issue, on the above subject, I would like to state that I met with the same result under exactly the same conditions as regards time and manner of sowing, rain, etc, and yet not a single plant has come up. I selected a very brackish spot —Yours, &c.,

GID. J. JOUBERT.

Welbedacht, Lady Grey, A.N., Aug 5, 1905.

A Bore Hole Query.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Recently I have been boring in the vicinity of my fountain to a depth of 120 feet, through hard rock, alternating a greyish and very dark bluish substance—the greyish layer never exceeding more than two feet and the blue being sometimes five feet and more thick. In close proximity to the bore-hole the water oozes out through crevices in the rock and on the whole my water has been strengthened—now, I would like to know whether it would be advisable to bore any deeper?

I may say, the site of the bore hole lies at the bottom of a basin in a poort, surrounded by high mountains

In years gone by a magnificent stream of water flowed out of the rock in the river bed close to the present bore-hole About ten years ago lightning struck in the vicinity of the fountain and ever since then the water has been much weakened, droughts no doubt adding their share towards lessening the flow

The bore-hole is 6 in. in diameter, water still oozes through crevices round the hole and I have inserted a piece of lining tube in the hole which projects 10 in above hole over which the water flows freely —Yours, &c

AGRICOLA.

Graaff-Reinet, Aug 8

This would appear to be a case calling for the old maxim—leave well alone. Some of our readers, however, may be able to offer advice based on experience.

Crops after Lucerne.

To the Editor, AGRICULTURAL JOURNAL

SIR —I had a field of lucerne which after standing well for seventeen years died off last year, whether through drought or " effluxion of time," I do not know, and as I should like, if possible, to grow lucerne on the same land again, may I ask you to advise me how to treat land for such purpose Could I put a crop of potatoes on it, and would potatoes thrive on same ?—Yours, &c

IGNORAMUS

Graaff-Reinet, May 3

Potatoes are scarcely advisable after lucerne as there is so much nitrogen left in the soil by the latter, but there is no reason why lucerne should not be successfully cropped again on this land Whatever may have caused the lucerne to give out it is very unlikely to a be of a permanent nature, because lucerne does not exhaust ground as a rule. However, the best thing to do now would be after thorough cultivation, to lay the land down to cereals for a while at least, either, oats, barley or mealies. Whether wheat would do in your district we are not prepared to say, but the farmers of Oudtshoorn state positively that wheat does not do well after lucerne. But, if needed, potatoes could be cropped after the cereals if the soil is considered good enough to stand such a severe strain without fertilisers It would be better, however, after thorough cultivation to lay it down to lucerne again

Lincoln Red Shorthorns.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I note in the *Agricultural Journal* for July that Lincoln Reds are mentioned amongst the entries of cattle in the S.A. Stud Book.

Can you give me any information about this breed, what their characteristics are, and what difference exists between the above and shorthorns? Who the principal breeders are and their addresses?

Trusting you will oblige me with the above information,—Yours, etc.

JOHN E. NILAND.

The Lincoln Red Shorthorn has been built up by the constant infusion of pure Shorthorn blood—that is, the Durham-York strain—upon the old Lincolnshire cattle. This has been going on for many years and the product to-day is considered very useful and profitable, and is much in demand. Its distinguishing characteristics are thus described:—Rich red colour, deep wide frame, down-pitched horns for the most part, and the habit of developing into great size and weight if allowed to do so. Their most remarkable characteristic is their great fleshiness of carcass. Among the more prominent English breeders are Mr. John Evens, of Burton, Lincoln, whose dairy stock has been very successful; Mr. John Marriott, the West Lea, Cropwell Butler, Notts, who has also achieved distinction; while the South-Eastern Agricultural College, at Wye, Kent, advertises its herd of Lincoln Reds. In this Colony, Col. W. J. Warren, M.L.A., of Bleak House, Stutterheim, and Mr. G W. Turpin, of Waterford, Kubusie, have some good imported stock.

Lime and Sulphur again.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—With reference to the discussion on Lime and Sulphur *versus* poisonous dip I hold there is no dip that can beat Lime and Sulphur. Our district, the Komgha District, has been practically clean for a number of years, all using Lime and Sulphur. I have a son who is managing one of my farms. He is twenty-three years old, and he has never seen a case of scab on my farm. My opinion is that Lime and Sulphur dip is beneficial to the health of the sheep for months. After dipping in moist weather, a sulphuric odour rises from the sheep. Poisonous dips I have never used, and never will while I can get fuel to dissolve the sulphur The poisonous dips must be injurious to the constitution of the sheep. I note one Mr. Southey, advocates Lime and Sulphur, and the other, Cooper's. Well, each one to his fancy, but I maintain there is no dip to beat Lime and Sulphur. As far as being injurious to wool is concerned, the wool grows after the dipping so I fail to see where the injury comes in.—Yours, etc.

JOSEPH HART.

Lily Vale, Komgha, August 10th, 1905.

Light *versus* Heavy Wools.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the August number of the *Agricultural Journal* I notice a paragraph, Light *versus* Heavy Wools. I think Messrs. Mosenthal are quite correct in their warning. How are you to make the sheep-farmer see the benefit of breeding for light wool when the storekeeper makes practically no difference in the price? I have been sheep-farming over forty years. For a number of years I have bred from Murray's Australian type. My son on the adjoining farm breeds from Vermont rams. I am sorry I have not had the opportunity of comparing notes. I have always received top price without any difficulty for my wool. Last season, as soon as my wool arrived in East London, it was sold at 8¾d. and 9d. unskirted. (You will perhaps say, Why don't you skirt? My answer is, While I can get top price for unskirted wool, I will not skirt.) My son's wool was not sold for months, and then only realised 8d. per lb.

For a number of years I have bought my rams from Mr D Wainwright, who has expended a lot of money in stud sheep He breeds Vermonts as well as Murrays. A few months back I was wanting rams I wrote Mr Wainwright that, as I was very ill, my son would pick the rams for me, and that he might require some Vermonts for himself Mr Wainwright wrote, saying he had no Vermonts for sale as the Orange River Government had taken all he had at £10 each Two years back their price was £8 each, as also the Murrays, which are now raised to £4. I take it the Orange River Government know very little about sheep farming and the requirements of the country. I admit some farmers have been successful in crossing with the Vermonts, but it needs a competent man—an expert. My idea is that putting Vermonts in the hands of inexperienced men spells ruination to the wool trade in South Africa —Yours etc

JOSEPH HART.

Lily Vale, Komgha, August 10th, 1905

Destruction of Spring Hares.

To the Editor, AGRICULTURAL JOURNAL

SIR,—An "Old Hand's" advise to "Troubled" on the destruction of the *Jerboa* (Spring Hare)

If convenient lead a stream of water into an open, fresh, and isolated burrow Watch and wait at its mouth for the exit of the culprits arrest without bodily harm or injury, two, three, or more Keep in custody until thoroughly dried and preserved from the effects of their drenching. Have each culprit lead back by a custodian to the village infested by them tie a good charge of dynamite to their tails, and at a given signal ignite and release into open burrows a few yards apart.

Retire immediately, and rest assured that those (if any) surviving will not trouble you again in a hurry but will prefer finding pastures new

If no stream of running water is convenient a 32 Gallon Cask full of water will suffice, or three or four boys with buckets from a pool of water within a few yards of the spot —Yours, &c

"OMPIF"

Deets Wdorp, O R C, Aug 12

Blaauwkam or Blue Comb in Fowls

To the Editor, AGRICULTURAL JOURNAL

SIR,—Many remedies are suggested now-a-days for Fowl-sickness, but I don't think a cure has as yet been found for the disease in fowls called "Blaauwkam" There is no preventive, for before any symptoms are noticed the fowls are dead, and it sometimes happens that the whole lot die within a very short time Thousands of fowls are lost annually in this way

The remedy I beg to suggest was, I believe first introduced by Mr Izaak Roux, and is as follows —As soon as any fatal cases have occurred, take one or two dead fowls, place them in a cooking pot, cook them thoroughly, and feed them (the two birds) to a lot of 20 or 30 fowls The next day take the water in which the dead fowls have been cooked add one or two pounds of bran and sulphur (according to the number of birds to be treated), and stir thoroughly I have tried this remedy for my sick birds with the greatest success the mixture is even used for cattle disease, and acts as a sort of inoculation

By inserting this in your Journal you will greatly oblige,—Yours, etc ,

S J VAN DER SPUY

Kerkplein, Paarl, August, 1905.

The combs of fowls become of a dark purple colour in all the septicæmic diseases of poultry, and the symptoms and course of the disease in each of the group are very similar But the particular disease which Mr. van der Spuy refers to is evidently *Chicken Cholera*, which is a highly infectious disease—due to a special organism called the *Bacillus Cholera Gallinorum*, which, under a high power of the microscope, appears as a very short rod-like body. It does not form spores, and is killed at a temperature of 122° Fah in fifteen minutes. If dried it dies in a few days, but retains its vitality for a considerable time in damp earth or in water.

It will be observed from the above, that the infective agent of Chicken Cholera is killed at a temperature of one-half that of the boiling point, hence, if the body of a fowl which died of chicken cholera is *cooked thoroughly* as recommended by Mr van der Spuy, all its infective properties would be completely destroyed It is difficult to understand, therefore, how either the flesh of the affected fowls, or the water in which they were boiled, could exercise any preventive effects against the development of the disease In fact, the flesh could be eaten and the fluid drunk, with perfect impunity, by either man or poultry.

In this connection it is of interest to note that it was with the infective organism of chicken cholera that Pasteur carried out his first experiments on attenuation and protective inoculation He found that by long continued cultivation, with free access of air filtered through cotton wool, the virus of chicken cholera became attenuated or weakened, and Pasteur was able in this manner to prepare a vaccine which protected fowls against inoculation with the most virulent virus It will be observed, however, that the virus was *weakened*, so that the virus produced a *modified form* of the disease, it was not *destroyed* It will be apparent to any one who understands the question, that no vaccine can exercise any preventive effect, or any effect at all, after its infective properties have been completely destroyed by heat I remember that, during the invasion of rinderpest some stock owners took the skin,, freshly removed from an animal which died of rinderpest, and filled it with salt, and then heated the salt within the skin in front of a big fire, shaking it occasionally, so that the exudation from the heated skin would penetrate the salt Healthy cattle were then dosed with the salt, and it was believed that it would give the said cattle an immunity to rinderpest But it did not If, therefore, it is a fact that the method recommended by Mr van der Spuy does exercise any influence in preventing the development of fowl cholera, I confess I am unable to understand how it acts

D HUTCHEON.

RURAL REPORTS.

For the month ending 15th August, 1905.

Aberdeen —High winds and changeable weather have prevailed here this month There has been no rain, nevertheless the veld is in fair condition in most of the district A fairly large quantity of seed has been sown but if rain does not fall soon the harvest will be poor Lucerne is now being sown as farmers begin to realise its value Cattle are in rather low condition and slaughter animals scarce Horses, etc , in fair condition Sheep and goats good Lambing has been fair and kidding is promising Ostriches are just beginning to breed

Bedford —The rainfall for July has been light although good rains fell in June and veld still shows a little green Locusts are present in parts of the district in pretty large swarms Weather is very much like early spring and we have had some hot days A fair amount of oats has been sown but in some parts the growing crops have been destroyed by locusts Cattle are still in low condition Very few calves so far Lung sickness reported on one farm Slaughter stock scarce Sheep are in good order. Lambing promises well and ewes have plenty of milk Slaughter animals are in fairly good condition and there is a fair supply Goats are doing fairly well Kidding season starts next month and so far it promises well Ostriches are in good condition and doing well and laying very well on most farms

Herbert —The weather still continues dry and cold and the pasturage is daily becoming worse Locusts are still about in large swarms The natives have destroyed wagon loads of them which they dry and use for food

Oudtshoorn —Veld in fair condition Heavy rains fell during July Weather fine Wheat and oats coming on well Lucerne thriving Orange trees suffering from Red Scale Cattle are in perfect health and calving season promises well Slaughter animals are in good conditien but scarce Horses, mules and donkeys in healthy condition Prices fair There are few sheep in this district, mostly Cape. Cape goats plentiful Breeding season good Ostriches in good condition and breeding fairly Pigs thriving and doing well on lucerne camps

Queenstown —The rainfall for the past month has been very light, viz , 01 inches, and below the average Veld is in fair condition the Karroo bushes having grown splendidly since the rain which fell at the end of June Weather at present mild and warm Since the rains began to fall a good deal of oats and wheat, and also some rye and barley, have been sown Lucerne just starting Cattle are in rather low condition Horses, etc , in fair condition, and prices good Sheep are also in good condition, and lambs doing well

Riversdale —Good but partial rains have fallen in this district during the past month, and veld is in fair condition Weather windy, wet and changeable Wheat and oats have just been sown Prospects good Lucerne where grown is doing well. Livestock of all descriptions are in fair to good condition Horses fetching very fair prices Ostriches breeding well

Robertson —July was an unusually dry month, but rain started falling on the 30th, and up to the present about 1 70 inches have been recorded The veld, which was in very bad condition, is now rapidly picking up Weather at present warm. Wheat, oats, and barley promise well Lucerne beginning to grow again Vines in good condition All Cape stocks Cattle are in good condition and free from disease Horses, mules, and donkeys are on the whole in very good condition Cape goats doing well No angoras Ostriches are in very good condition Pigs also thriving

Van Rhynsdorp.—Rainfall for the past month was ·66 inches, which is very good for this place. Veld improving and crops coming on well. Slaughter cattle scarce and dear. Horses and mules in good condition and free from disease. Locusts have made their appearance, but not in very large numbers. Prospects encouraging on the whole.

TRANSKEI.

For the month ending 31st July, 1905.

Bizana.—The weather during the month has been mild. No rain fell; still the veld is good, and stock of all kinds are in good condition and free from any disease. The crops have been harvested, and I am glad to report they are well above the average, and grain is being bought by traders and others at from 3s. to 10s per muid.

Cofimvaba.—The district is remarkably free from contagious or infectious diseases amongst stock, all animals are in good condition for the time of year, and recent light rains followed by warm days have kept the pasturage fresh during winter. The lambing season has been very good, the loss of young lambs is small in comparison with the past few years. Large numbers of sheep, estimated at from 20,000 to 30,000, have been sold to speculators and others from the O.R. Colony during the past few months, a bag of mealies is given for each sheep. This is an advantage in more ways than one, as the natives are enabled to buy mealies at a cheap rate, and the district is becoming a little less overstocked The early winter rains were taken advantage of, ground has been broken up for spring, and in some places crops of wheat have been sown In fact, this is the best winter season and early spring we have had for the past 10 years

Flagstaff.—The weather during the past month has been pleasant and the Natives have all been busy reaping their crops. The yield of mealies has turned out much better than was anticipated and may be considered as a very fair crop. This grain is now selling at 7s to 10s per bag. Kaffir corn is rather scarce. Pasturage continues fair and stock are doing well

Idutywa.—During the last month there has been little or no change. The weather has been dry and there was a good deal of wind so that pasturage has become less supporting, still stock of all kinds are in good condition. No ploughing has been done.

Kentani.—Everything is now practically at a stand-still Nothing will be done in the way of agricultural pursuits for a month or two, when the usual rains will have set in. Pasturage is good

Libode.—During the past month there has been no rain at all. The weather has been very warm, however, for the time of the year, and there is every sign of an early spring. The natives have been busy reaping their crops, which in some parts of the district have been very fair, notwithstanding the unprecedented drought last year. Stock of all kinds are in excellent condition.

Matatiele.—The weather during the past month has been most unusual for this time of the year. Spring weather prevailed right throughout, and the absence of wind was very marked. No rain, however, fell, but we are still deriving the benefits of the snowstorm on the 31st May last. At a depth of six inches the ground is still quite damp, and the snow-capped peaks of the Drakensberg continue to feed the rivers running through the district. All descriptions of stock are very healthy, and not a single case of animal disease has been reported. I am given to understand that in some places on the Berg and in the Mvenyane sheep have already been put on the burns. Everything points to an early spring, and it only requires a few soaking showers for the veld to burst forth into life everywhere in the district. The harvesting operations have now been concluded, and notwithstanding the drought at the beginning of the summer the crop has exceeded all expectations, although not up to last year's output.

Mount Currie.—There is nothing of interest to report for the past month. The weather has been seasonable. No rain fell during the month and the veld in consequence is poor. All live stock are, however, in very fair condition. A case of glanders was reported in the town, having been introduced from Pondoland Two of the infected animals were shot.

Mount Frere—The crops have now been gathered, and the yield has been better than was anticipated. There will be no want in this district. Pasturage is in excellent condition for this season of the year, and in some localities is better now than it was in November last year. Stock are in good condition and there are no cases of disease, except a few of mange both in cattle and horses There have been no fresh outbreaks of scab in sheep, and the mild weather prevailing during this month has enabled the sheep inspectors to deal with the few cases which occurred in June last. There is every indication of an early spring, unless dry hot winds retard the growth of the veld, which in some of the burns is already coming on fast Oak trees are putting out leaves, and early peach trees are in blossom, which is very unusual at this time in this district

Ngqeleni—No rain has fallen during this month, but the veld is in good condition No cattle diseases have been reported and horse sickness has entirely disappeared Grain on the coast is plentiful, but not in such quantities as was expected. There is every prospect of an early spring

Nqamakwe—There was practically no harvest reaped last month owing to the severe drought which prevailed last year The weather last month was abnormally mild, and there are indications of an early spring The lambing season promises to be good The veld is unusually good for winter in consequence of the heavy rains which fell during May and June There is nothing to add to my last in regard to the state of stock generally

Tabankulu.—The last month has been exceptionally dry, and the weather unusually warm for the season of the year Spring seems to be fast approaching The mealie crops have turned out rather well and the Natives are reaping all over the district Mealies are fetching about six shillings a bag One case of lungsickness was reported during the month, and the area of infection has been quarantined Otherwise stock of all descriptions are doing very well.

Tsolo—The winter is proving an exceptionally mild one. The crops have now been reaped, and are somewhat beyond previous expectations. Stock are in fair condition, and no contagious diseases have been reported during the past month.

Willowmore.—Stock on the whole are in good condition A few cases of lungsickness were reported during the month The value of stock is still decreasing The weather has been exceptionally warm this month, with a few windy days No crops, to speak of, are in the ground. The fruit (oranges and guavas) are not so plentiful nor good as usual The veld is in fairly good condition. Natives are just beginning to burn the grass

NOTES ON THE WEATHER OF JULY, 1905.

By Charles M. Stewart, B.Sc, Secretary to the Meteorological Commission.

A depth of exceptionally mild, dry weather, with a marked absence of severe frosts, frequent local fogs, an almost entire absence of thunderstorms, and the frequent occurrence of hot drying winds were the most notable features of last month's weather

Precipitation—The rainfall during last month amounted on the mean of 336 stations, to only 0·69 in. falling on two days,—being 0·63 in or 48 per cent. less than the average The deficit appears to have been general over the whole country, and speaking broadly increased in amount from the coasts inland. A state of absolute drought appears to have prevailed over the Northern Border, Bechuanaland, the greater part of Basutoland and the Orange River Colony, while the deficiency of rainfall was least (32 per cent) over the Cape Peninsula. On examining the monthly totals, it is found that of the whole 336 stations, no fewer than 138 or 41 per cent. reported "Nil," and 133 had one inch or less, leaving only 63 or 19 per cent. with more than one inch for the month. Of these last, 32 stations situated (with 2 exceptions) in the first four Divisions, had between 1 and 2 ins., 10 had 2 to 3 ins, an equal number had 3 to 4 ins. 3 had 4 to 5 ins., 4 had 5 to 6 ins., and 2 each had between 7 to 8, 8 to 9, 9 to 10 ins. The largest quantities collected during July were 9 45 ins. at Kasteel's Poort on Table Mountain; 8 18 ins. at St. Michael's (Table Mountain) and Bishopscourt; 7 65 ins. at Waai Kopje and 7·24 ins. at Groot Constantia, all in the Cape Peninsula. On subjecting

Division	Mean Rainfall (1905).	Mean No of Days	Average Rainfall (1894 1903)	Average No. of Days	Actual Differences from Averages	Percentage Differences from Averages
	Inches		Inches		Inches.	Per cent.
Cape Peninsula ..	4·28	9	6·28	13	—2·00	— 32
South-West ..	2·01	5	3·23	8	,, 1·22	,, 38
West Coast ..	62	3	1·51	6	,, 0·89	,, 59
South Coast ..	89	4	1·86	5	,, 0·47	,, 35
Southern Karroo ..	·16	1	·61	3	,, 0·45	,, 74
West Central Karroo ..	15	1	·34	2	,, 0·19	,, 56
East Central Karroo .	01	1	·16	2	,, 0·15	,, 94
Northern Karroo ..	01	1	28	2	,, 0·27	,, 96
Northern Border ..	·00	0	·17	1	,, 0·17	,, 100
South-East ..	·22	2	·45	2	,, 0·23	,, 51
North-East ..	01	1	·32	2	,, 0·31	,, 97
Kaffraria . ..	·19	1	·32	2	,, 0·13	,, 41
Basutoland .	·05	1	..	..	.	..
Orange River Colony ..	·14	1	..	..	..	..
Durban (Natal) ..	71	3	1·30	..	— 0·59	— 45
Bechuanaland ..	00	0	·10	1	,, 0·10	,, 100
Rhodesia	12	2	..	..	..	.

the maximum daily falls to a similar scrutiny, it is seen that out of 331 station furnishing the necessary particulars, only 18 recorded a maximum for the month exceeding 1 in., 175 (excluding those with "no rainfall" having 1 in. or less. Of these eighteen 14 had a maximum precipitation in 24 hours of 1 to 2 ins., 3 had between 2 and 3 ins, and only one exceeded 3 ins., viz, Ceres with 3·12 ins. on the 31st. The next three largest totals were 2·93 ins. at Kenilworth on the 1st, 2·87 ins. at Rawsonville on the 4th, and 2·05 ins at Groot Constantia on the 30th. From these considerations it is to be expected that the veld would not be in the best condition, and although continuing fairly good owing to the rains in May in some districts, it is becoming dried up in others. A striking piece of evidence of the unusually dry weather of the month even over the South West, is found in the remark of our observer at Weltevreden in the Groot Drakenstein district (Mr. Lionel Baker) to the effect that he had "started irrigating crops"; very little rain fell there between the 3rd and 29th of the month.

Thunderstorms were reported from only 3 stations, viz., Port St. John's on the 6th, Umtata on the 7th and Piquetberg on the 28th No falls of *Hail* or *Snow* were reported, but *Sleet* was noted at 4 stations on 2 days, viz. 3rd and 4th.

Temperature, Cloud and Wind.—Contrary to the usual nature of the annual temperature curve, the monthly mean for July exceeded that of June, being 3·3° warmer. The mean temperature of last month was 54·8°, the mean maximum temperature was 66·9°, and the mean minimum 42·6°, both day and night temperatures having a decided upward tendency as compared with the previous month. The mean daily range was 24·3°, or 5·1° more than in June. This unusual warmth seems to have been general all over the country, being greatest (about 3·5°) in the West, about 1° in the East, and 2° to 3° in the interior. This increase in temperature was almost equally divided between the day and the night temperatures, except in the interior, where the warm maxima were 3·4° higher and the night temperatures only a little more than half a degree in excess of the average. As a result of this unusual mildness of the month, the fruit trees in many places are in blossom, and consequently are liable to be damaged by the sharp frosts which are usual in August. The mean warmest station was Port St. John's with 61·8° for the month, and the mean coldest, Leribe in Basutoland, with 44·8°, a difference of 17° F. The highest mean maximum of 73·3° was recorded at King William's Town, and the lowest mean minimum of 29·4° at Leribe. The dates of the occurrence of the absolute maximum for the month varied considerably, but may be said to centre round two warm spells from 14th to 16th and 24th to 30th. The lowest temperatures recorded seem to have similarly occurred in connection rather with a series of cold spells than on individual days, viz, 1st to 3rd, 6th to 8th, 12th to 16th; a few minima were, however, recorded on other days The mean of the highest temperatures for the month was 76·8°, and of the lowest temperatures 35·0°, giving a mean monthly range of 41·8°, as against 37° in June. The highest temperature registered during the month was 87·0° at Storm's River on the 10th, and the absolute minimum 21·0° at Leribe on the 13th The extreme range therefore throughout the month amounted to 66°, as compared with 61·8° in June *Frosts* were reported from 64 stations as occurring on 29 days of the month. the two exceptional dates being the 4th and 21st. These frosts were light, and caused practically no damage to tender shoots or blossoms They were most commonly reported between the 6th and the 18th, more particularly on the 6th, 11th, 12th, 16th, and 18th.

The mean percentage of *Cloud* during the month was only 35, or 10 per cent. less than in June The amount of sky obscured was mostly between 45 and 55 per cent. in the South-West, decreasing to 35–45 in the South and South-East, this latter amount prevailed some distance inland, but decreased in the interior to less than 20 per cent. The mean amount of Cloud for the month was greatest (77 per cent.) at Cape L'Agulhas and least (12 per cent.) at Kenhardt. *Fog* or *Mist* prevailed at 75 stations on 28 days of the month, the only days on which this phenomenon was not reported being the 3rd, 25th, and 30th; they were most general on the 22nd and 23rd.

A partial explanation of the drought during the month is given by the fact that the prevalent morning winds were mostly southerly in the South-West, westerly to north-westerly over the greater part of the rest of the country; but north-easterly at the more Northerly stations. The average force on the Beaufort Scale was 2·10, corresponding to a velocity of 13·5 miles per hour. The wind was exceptionally strong at times, attaining the force of a gale on 8 days at 11 stations, chiefly on the 7th. Hot winds seem to have been rather prevalent throughout the month, 13 cases being noted on 11 days.

OBSERVERS' NOTES.

VRUCHTBAAR —The latter part of July we had very warm days for this time of year and as fine weather in July means the early blooming of our fruit trees, they are apt to be caught by cold snaps which we are sure to get in August.

Ezeljagt.—No frost or cold weather during the month, more like summer than winter.

Tankatara.—Very dry veld scarce, stock falling off.

Bloemhof.—Weather most unseasonable, hot N.W. winds.

Corndale.—Very high winds and temperature very changeable.

Boschfontein.—Frosts occurred all through the month. Prevailing winds N. and N.W. Latter part of month warm, hazy weather with occasional cloudy days. Veld fairly good owing to rains at end of May but not likely to continue so unless some more rains fall soon. Large numbers of flying locusts in different parts and apparently breeding, very little damage done by them to date.

Tarkastad.—Two large swarms of locusts moving very slowly through district, clearing growing crops.

Waverley.—Perfect weather all the month, except the 31st. Very little frost, and warm days.

Griquatown.—No rain, severe drought.

Van Wyk's Vlei.—Swarms of locusts over lands on the 18th, slight damage. Veld remains good.

Bolotwa.—Remarkably calm and mild month for this time of year. Grass shooting and never enough frost to scorch it up.

Carnarvon Farm.—The return of Nil for this month and the same for July, 1904, constitutes a record for two absolutely dry Julys. Windy days 16, frosty days, 24, cloudless days 5. This is about a fair average for the last six years. For 1902 we had 12 cloudless days. The frosts, 24 in number, have been exceptionally light ones, only three really severe frosts occurred—though a conspicuously visible hoar frost every morning so to speak. There was a lot of dew with it which neutralised the frost effects. The last week of month produced the 5 cloudless days, calm and hot, so much so that willow trees are green in July, the first green tinge usually in first week in August. Ground is still damp, wet in some places, but no green grass and we shall have at least a dozen more sharp frosts during August. Prospects that were good are waning.

Thibet Park.—Very dry and warm, rain wanted badly now.

Fort Rixon.—Wind from all quarters, the way it keeps chopping round very unusual for this time of year.

Groot Drakenstein.—All temperature readings above the normal, means 3.7° above average six years, mean maximum 5° above and mean minimum 2.5° above. Exceedingly dry up to the 30th. Started irrigating crops. Rainfall 1.98 in. below average (5.18 in.). Total January—July 19.85 in. Average January—July 23.64 ins.

Kokstad (The Willows).—High barometer, calm weather, frequent frost and occasional high winds in afternoons. These latter occurred on six days. Rain fell on one day only for two hours (0.11 in.). Veld dry, stock in fair condition. No disease reported. Oaks, willows and some fruit trees in bud. This is unusually early.

TEMPERATURE, JULY, 1905.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min	Date.
Royal Observatory	65·1	52·2	58·6	75·8	15	41·4	12
S. A. College	68·3	50·1	59·2	83·0	28	43·5	12
Simon's Town	67·9	54·8	61·3	82·1	24	48·8	13
Wynberg	67·4	50·5	58·9	79·7	24	43·5	12
Blaauwberg	66·1	51·2	58·6	79·0	24	43·0	13
Sea Point	67·2	52·8	60·0	80·6	24	45·0	12
Groot Constantia	65·1	51·0	58·0	80·0	24	45·0	6,11,12 18 & 31
Groot Drakenstein	68·8	46·9	57.8	83·2	27 & 28	37·3	19
Elsenburg (Agri. College)	66·7	45·1	55·9	80·7	28	36·5	19
Robertson Govt Plantation	70·2	42·8	56·5	82·0	16	33·0	5
Ceres	65·2	36·3	50·8	70·0	14 & 26	30·0	7 & 22
O'okiep	68·9	46·5	57·7	78·0	25	35·2	2
Van Staaden's River	68·5	47·2	57·8	81·0	30	38·0	2
Storms River	68·4	46·4	57·4	87·0	10	38·0	1
Concordia (Plantation)	64·9	50·3	57·6	83·0	29	43·7	1
Heidelberg	69·0	41·1	55·0	81·0	24	35·0	1
Cape L'Agulhas	62·1	54·9	58·5	69·0	16 & 24	49·0	12 & 19
Cape St. Francis	67·9	51·4	59·6	82·0	16 & 24	44·0	2
George (Plantation)	66·8	48·1	57·4	83·0	29	42·0	6
Port Elizabeth	68·8	51·2	60·0	81·0	13	44·0	16
Rust en Vrede	67·2	43·9	55·6	79·0	24	31·0	1
Amalienstein	70·8	38·4	54·6	82·0	29	31·0	19
Murraysburg	65·4	33·3	49·4	71·0	26, 28 & 29	26·0	18
Wagenaar's Kraal	63·7	35·5	49·6	72·0	29	27·0	1, 6, & 12
Kimberley	70·6	36·7	53·6	79·9	30	28·2	2
Hope Town	68·1	33·5	50·8	75·0	29	28·0	14 & 15
Sydney's Hope	65·8	48·5	57·2	79·2	29	39·2	3
King William's Town	73·3	42·0	57·6	85·0	29	35·0	1
East London	70·5	49·4	59·9	82·0	11	44·0	2
Bedford	69·1	42·6	55·9	81·0	27	31·0	8
Stutterheim	68·9	46·9	57·9	78·5	25	34·5	6
Aliwal North	66·1	30·3	48·2	70·5	28 & 30	24·0	16
Rietfontein	60·4	30·5	45·5	66·0	29 & 30	27·3	15
Queenstown	67·9	37·2	52·6	76·0	26	28·0	6
Matatiele	66·8	34·5	50·6	70·0	27 & 30	28·0	18
Port St. John's	71·7	51·9	61·8	82·0	11 & 18	44·0	4
Kokstad (The Willows)	66·6	32·8	49·7	73·5	30	26·8	16
Umtata	72·5	36·9	54·7	81·0	26	31·0	6, 14, & 17
Teyateyaneng	63·9	30·5	47·2	67·0	28, 29, & 31	26·0	2
Moyeni	60·8	30·3	45·6	67·0	30	24·0	15
Leribe	60·3	29·4	44·8	68·1	31	21·0	13
Mafeteng	62·8	33·0	47·9	67·0	28	26·0	14
Mohalie's Hoek	63·2	31·9	47·5	68·0	30 & 31	25·0	15
Hope Fountain	66·2	42·2	54·2	78·6	31	35·5	10
Means	66·9	42·6	54·8	76·8	..	35·0	.
Extremes	..	..	..	87·0	10th	21·0	13th

RAINFALL, JULY, 1905.

I. CAPE PENINSULA:

	INCHES
Royal Observatory, (*a*) 12 inch gauge	2·46
Cape Town, Town House	2·57
Do South African College	3·65
Do Sea Point (Hall)	1·99
Do do. (Attridge)	2·55
Do Molteno Reservoir	3·68
Do Platteklip	5·19
Do Signal Hill	1·97
Table Mountain, Disa Head	4·27
Do Kasteel's Poort	9·45
Do Waai Kopje	7·65
Do St. Michael's	8·18
Bishopscourt	8·18
Kenilworth	9·04
Wynberg (St. Mary's)	5·52
Groot Constantia	7·24
Tokai	4·42
Simon's Town (Wood)	3·69
Do. (Gaol)	3·20
Blaauwberg Strand	1·76
Robben Island	1·63
Camp's Bay	2·67
Fish Hoek	2·40
Cape Point	1·01
Woodstock	3·23
Do (The Quarry)	4·20
Plumstead (Colmwood)	3·72

II. SOUTH-WEST.

Eerste River	1·85
Stellenbosch (Gaol)	0·89
Somerset West	2·02
Paarl	1·32
Groot Drakenstein	3·20
Tulbagh	1·32
Kluitjes Kraal	3·54
Ceres	5·84
Caledon	3·12
Worcester (Gaol)	0·63
Hex River	1·33
Robertson	0·26
Robertson (Govt. Plantation)	0·25
Montagu	0·00
De Hoop (Div. Robertson)	1·25
Rawsonville	5·60
The Oaks	0·76
Danger Point	2·89
Vijgeboom's River	3·40
Elsenburg Agricultural College	2·81
Roskeen	1·63
Vruchtbaar	1·56

III. WEST COAST:

Klipfontein	0·07
Kraaifontein	0·00
O'okiep	0·16

III. WEST COAST—*Continued*

	INCHES
Springbokfontein (Gaol)	0·42
Garies	0·12
Kersefontein	0·74
The Towers	1·74
Dassen Island	1·03
Malmesbury	0·70
Piquetberg	2·08
Van Rhynsdorp	0·03
Clanwilliam (Gaol)	0·33
Lilyfontein	0·8
Anenous	0·12
Zoutpan	0·90
Wupperthal	0·66

IV. SOUTH COAST:

Cape L'Agulhas	0·96
Bredasdorp	1·40
Swellendam	0·74
Heidelberg	0·71
Riversdale	0·61
Geelbek's Vlei	0·00
Mossel Bay	0·72
George	1·81
Ezelzagt	0·00
Millwood	0·95
Sour Flats	0·85
Concordia	1·17
Knysna	1·11
Buffels Nek	1·80
Harkerville	0·89
Plettenberg Bay	1·10
Blaauwkrantz	1·13
Storm's River	1·46
Cape St. Francis	0·46
Zuurbraak	2·25
Vogelvlei	0·30
Great Brak River	0·40
Witteklip	0·51
Van Staaden's (upper)	0·48
Do (lower)	0·59
Uitenhage	0·18
Do (Park)	0·15
Port Elizabeth (Harbour)	1·27
Tankatara	0·18
Lottering	0·90
Shark's River (Nursery)	1·42
Do (Convict Station)	1·32
Centlivres	0·09
Woodifield (George)	1·76
George (Plantation)	1·50
Potberg	0·82

V. SOUTHERN KARROO:

Ladismith	0·14
Amalienstein	0·09
Calitsdorp	0·00

V. S. KARROO—*Continued*	INCHES
Oudtshoorn	0·22
Uniondale	0·32
Kleinpoort	0·00
Rust en Vrede	0·37

VI. WEST CENTRAL KARROO:

Prince Albert	0·00
Zwartberg Pass	1·50
Beaufort West	0·00
Nel's Poort	0·00
Camfer's Kraal	0·00
Baaken's Rug	0·00
Willowmore	0·04
Steytlerville	0·00
Krom River	0·00

VII. EAST CENTRAL KARROO:

Aberdeen (Gaol)	0·00
Rietfontein	0·00
Klipdrift, De Erf	0·00
Kendrew	0·00
Graaff-Reinet	0·00
New Bethesda	0·05
Roode Bloem	0·03
Glen Harry	0·06
Bloemhof	0·06
Jansenville	0·00
Toegedacht	0·00
Klipfontein	0·00
Cranemere	0·00
Pearston	0·00
Somerset East	0·00
Middleton	0·00
Corndale (Div. Aberdeen)	0·00
Middelwater	0·00
Darlington	0·00
Roode Hoogte	0·00
Walsingham	0·00
Arundale	0·00
Spitzkop (G. R.)	0·00

VIII. NORTHERN KARROO.

Calvinia	0·11
Sutherland	0·00
Fraserburg	0·00
Carnarvon	0·05
Wagenaar's Kraal	0·00
Brakfontein	0·00
Victoria West	0·06
Britstown	0·00
Murraysburg	0·00
De Kruis	0·02
Richmond	0·02
De Aar	0·00
Philip's Town	0·00
Boschfontein	0·00
The Willows	0·00
Naauwpoort	0·00
Middelburg	0·00
Colesberg	0·00
Cradock	0·00
Do. (Station)	0·00
Witmoss	0·00
Steynsburg	0·00

VIII. N KARROO—*Continued*	INCHES
Quagga's Kerk	0·17
Tarkastad	0·03
Riet Vlei	0·00
Varken's Kop	0·00
Culmstock	0·00
Doorskuilen	0·00
Hillmoor	0·00
Wildebeestkooij	0·00
Maraisburg	0·00
Waverley	0·07
Montagu	0·00
Schuilhoek	0·00
Vosburg	0·00
Zwavelfontein	0·00

IX. NORTHERN BORDER.

Pella	0·00
Kenhardt	0·00
Van Wyk's Vlei	0·00
Prieska	0·00
Dunmurry	0·00
Griqua Town	0·00
Campbell	0·00
Douglas	0·00
Avoca (Herbert)	0·00
Hopetown	0·00
Orange River	0·00
Newlands (Div. Barkly West)	0·00
Kimberley (Gaol)	0·00
Do. (Stephens)	0·00
Bellsbank (Div Barkly West)	0·00
Barkly West	0·00
Upington	0·00
Trooilapspan	0·00
The Halt	0·00
New Year's Kraal	0·00
Karree Kloof	0·00

X. SOUTH-EAST:

Melrose	0·05
Cheviot Fells (Bedford)	0·05
Bedford (Gaol)	0·10
Do (Hall)	0·13
Sydney's Hope	0·37
Adelaide	0·06
Atherstone	0·29
Alexandria	0·55
Salem	0·15
Graham's Town (Gaol)	0·46
Heatherton Towers (near Graham's Town)	0·17
Fort Beaufort	0·14
Katberg	0·39
Seymour	0·15
Glencairn	0·50
Port Alfred	0·36
Hogsback	0·32
Thaba N'doda	0·07
Peddie	0·10
Cathcart	0·00
Keiskama Hoek	0·16
Thomas River	0·00
King William's Town	0·00
Do. Hospital	0·20
Stutterheim (Besté)	0·09

X. SOUTH-EAST—*Continued*	INCHES
Dohne ..	0·07
Daggaboer	0 00
Lynedoch	0 00
Sunnyside	0 48
Kubusie	0 00
Blaney	0·00
Kei Road	0 26
Evelyn Valley	0 86
Berlin ..	0·00
Isidenge	0·38
Perie Forest	0 35
Quaou Forest	0 08
Kologha	0 47
Fort Jackson	0 00
Komgha	0 22
Prospect Farm (Div. **Komgha**)	0 31
East London, West	0·19
Do East ..	0·32
Fort Cunynghame	0 20
Fort Fordyce	0 7
Crawley	0 00
Forestbourne	0·40
Chiselhurst	0 26
Wolf Ridge	0 52
Dontsah	0 34
Mount Coke	0 30
Blackwoods	0·19
Albertvale	0 09

XI. NORTH-EAST

Venterstad	0 00
Ellesmere	0 00
Molteno Station	0·00
Thibet Park	0 01
Sterkstroom	0·00
Rocklands	0 00
Aliwal North (Gaol	0·00
Do. (Brown	0 00
Rietfontein	0 00
Hex's Plantation	0 14
Carnarvon Farm	0 00
Jamestown	0 00
Queenstown (Gaol	0 01
Do. (**Beswick**)	0 05
Dordrecht	0·02
Tylden	0 00
Herschel	0·00
Lady Grey	0 00
Bolotwa, Contest	0·07
Lady Frere	0·00
Keilands	0·05
Barkly East	0 00
Lyndene	0·00
Moorfontein	0·00
Whittlesea	0·00
Halseton	0·00
Sterkspruit	0·00
Table Hill	0·00
Albert Junction	0·00
Hughenden	0·00
Glen Wallace	0·00

XI. NORTH-EAST—*Continued*	INCHES
Indwe (D.E's)	0·00
Bensonvale Inst	0·00
Cathcart (Queenstown)	0·00

XII. KAFFRARIA:

Slaate, Xalanga	0·00
Ida, Xalanga	0 00
Cofimvaba	0·10
Nqamakwe	**0·15**
Engcobo	**0·25**
Butterworth	**0·22**
Kentani	**0·52**
Maclear	**0·14**
Idutywa	**0·00**
Willowvale	**0·38**
Mount Fletcher	**0·00**
Elliotdale	**0·15**
Mqanduli	**0·18**
Matatiele	**0·00**
Umtata	**0·32**
Port St. John's	**1·45**
Umzimkulu	**0·00**
Tabankulu	**0·27**
Somerville (Div. Tsolo)	**0·08**
Tsomo	**0 10**
Bazeya	**0·40**
Cwebe ..	**0 37**
Seteba	**0 00**
Flagstaff	**0 00**
Insikeni	**0 02**
Mandileni	**0 00**
Cedarville	**0·11**
Kokstad (The Willows)	**0 11**

XIII. BASUTOLAND:

Mafeteng	**0·00**
Mohalie's Hoek	**0·00**
Qacha's Nek	**0 34**
Moyeni Quthing	**0·00**
Teyatayaneng	**0·00**
Leribe ..	**0·0**
Maseru	**0·00**

XIV. ORANGE RIVER COLONY.

Imperani	**0·00**

XV. NATAL

Durban, Observatory	**0 71**

XVII. BECHUANALAND.

Vryburg	**0·00**
Taungs	**0 00**
Setlagoli	**0·00**

XVIII. RHODESIA:

Hope Fountain	**0·19**
Fort Rixon	**0·06**

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 19th August, 1905, ruling at the several centres named, is published for general information:—

CENTRE.	A Wheat per 100 lb.	B. Wheat Flour per 100 lb	C. Boer Meal per 100 lb.	D. Mealies per 100 lb	E. Mealie Meal per 100 lb	F. Barley per 100 lb	G Oats per 100 lb	H Oat-hay per 100 lb	J. Potatoes per 100 lbs.	K Tobacco (Boer Roll) per lb.	L Beef per lb	M. Mutton per lb	N. Fresh Butter per lb.	O. Eggs per doz	P. Cattle (Slaughter)	Q. Sheep (Slaughter.)
	£ s d	£ s d	£ s d	£ s d	£ s d	s. d.	s d	£ s. d	£ s d.	£ s d	s. d	s d	£ s. d.	s. d.		
Aliwal North ...	0 12 0	0 14 0	0 13 0	0 6 0	0 9 0	10 0	9 0	0 8 6	0 8 0	1/6 to 1/-	*0 7	*0 6	0 1 3	1 6	£10	19 -
Beaufort West	0 12 0	0 18 0	0 13 0	0 8 0	0 11 6	10 0	8 0	0 6 3	0 10 0	0 0 9	*6d to 1s †5d to 10d	*7d & 8d †5d to -d	0 1 9	2 6	£16	25/-
Burghersdorp ..	...	...	...	...	...	.	..	..	0 7 0	...	*0 9½	*0 9	0 2 0	1 6	...	...
Cape Town .	0 9 3	0 13 3	0 11 3	0 7 0	0 8 0	7 2	7 4	0 3 7½	9/- to 10/-	0 0 8	0 9	0 7½	1/2 to 1 4	1/1 to 1/2½	£16 to £20	25/-
Clanwilliam ...	0 12 0	0 15 0	0 14 0	0 9 0	...	7 0	10 0	...	0 9 0	0 4 0	0 8	0 8	0 1 0	1 0	...	...
Colesberg ...		...	...	...	...	...	...	..	0 15 0	...	...	*0 7	0 1 3	1 3	...	...
Cradock ..	0 10 0	..		0 5 9	..	..	...	0 8 0	0 13 0	0 0 5	0 5	0 7	0 1 6	1 2	...	...
Dordrecht ...	0 10 6	0 12 0	0 12 0	0 7 6	0 8 6	9 0	8 0	0 8 6	0 12 6	0 1 0	0 8	0 7	0 1 0	1 0	£ 0	20/-
East London ...	0 13 0	0 15 6	0 13 0	0 6 6	0 10 0	7 6	6 6	0 7 0	0 9 0	0 1 6	9d & 9d	8d & 9d	0 2 0	1 6	£21	36/-
Graaff-Reinet ...	0 10 6		0 11 6	0 6 0	.	8 0	9 0	0 7 6	0 12 0	0 0 6	0 7	0 7	1/9 to 2/-	1 3	£10 to £12 10s	20/- to 25/-
Graham's Town		...	...	0 7 6	...	9 6	...	0 5 3	0 12 6	...	*0 8	*0 8½	0 2 5	1 1½	..	...
Kimberley ...	0 11 0	0 14 3	0 13 0	0 6 6	0 6 6	9 0	8 3	0 5 6	0 15 0	0 0 6	*0 10	*0 8	0 1 6	1 9	£12 to £14	18/- to 22/-
King Wm's Town	0 10 0	0 14 9	0 12 6	0 7 6	0 7 6	8 0	9 0	0 7 0	0 9 0	0 0 6	*0 6½	*0 6½	0 1 9	1 3	£14	25/-
Malmesbury ...	0 8 6	0 13 6	0 10 6	0 7 6	...	7 0	6 0	0 3 3	0 8 4	0 1 0	*8d & †8d	*9d & †9d	0 1 3	1 0	£16	23/6
Mossel Bay ...	0 10 0	0 15 0	0 18 0	0 15 0	...	4 0	10 0	0 8 6	0 16 6	0 1 0	*9d & †8d	9d & †8d	0 2 0	1 6	...	...
Port Alfred ...	0 11 0	0 19 0	0 15 0	0 8 6	0 12 0	6 0	10 0	0 5 0	0 12 0	0 0 9	*0 8	*0 9	0 1 6	0 9	...	...
Port Elizabeth ...	...	...	...	0 7 0	...	7 0	..	0 4 6	0 15 0	0 0 4	0 7	0 7	0 2 0	1 6	...	...
Queen's Town ...	0 6 0	0 15 0	0 7 9	0 6 0	0 6 9	6 3	6 3	0 6 6	0 7 6	0 1 9	*0 7	*0 7	0 1 9	1 6	£ 2 to £15	18/6
Tarkastad ..	0 13 6	0 12 0	0 12 0	0 14 0	0 12 0	10 6	...	0 8 6	0 10 0	0 1 0	*8d & †6d	*6d & †6d	0 1 6	1 6	£13	22 6
Vryburg ..	0 11 0	0 18 0	0 14 0	0 5 9	0 9 6	12 0	9 6	0 7 6	0 11 0	0 0 6	*0 10	*0 9	0 1 9	1 0	£13 10s	20/-
Worcester ..	0 9 0	0 14 0	0 11 3	0 7 6	0 8 6	8 0	7 0	0 4 6	0 9 0	0 0 6	*9d & †8d	*8d & †7d	0 1 6	1 3	...	...

NOTE.—A blank space denotes "no transactions" † Imported. * Colonial.

DEPARTMENTAL NOTICES.

Introduction of Live-stock—including Swine—into the Transvaal Colony.

The following conditions regulating the introduction of Live-stock—including Swine—into the Transvaal Colony, as recently imposed by that Government, are published for general information —

D. Hutcheon,
Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon
Cape Town, 10th July, 1905.
No. 6.

No. 1.—Cattle.

No cattle will be admitted into the Transvaal by road or rail unless the owner has previously applied and obtained a written permit from the Department of Agriculture, Pretoria. This permit must be presented to the Stock Inspector along with the animals at the Ports of Entry specified in the permit.

In making application for this permit the following particulars must be furnished: Name of owners, locality from which the cattle come, purpose for which they are being introduced, number of animals to be introduced (if coming by rail, station at which they are to be trucked, station at which they are to be derailed), name of consignee and ultimate destination of the animals. These particulars are required for the information of the Advisory Committee of the Ward or District into which the cattle are to be introduced, by whom all permits have to be recommended before they are issued.

Slaughter Cattle will be branded at the Port of Entry with the brand $\overset{S}{\underset{\wedge}{-}}$ *on the left side of the neck before proceeding to their destination, if this has not been already done by the consignor before shipment.*

No. 2.—Equines.

All persons introducing equines into the Transvaal must produce certificates for their animals signed by a qualified Veterinary Surgeon holding the Diploma of the Royal College of Veterinary Surgeons, England, stating that the animals are free from disease, and that they have been tested with mallein, and all have reacted in a normal manner. These certificates will be collected by the Stock Inspector at the Port of Entry. If any horse is presented for admission without a certificate, it will either be tested with mallein by the Stock Inspector, and allowed to enter after the Inspector is satisfied that the animal is free from disease, or it may be allowed to proceed to its destination and tested there, whichever course is most convenient for the Department.

Exceptions.

Equines which are engaged in to and fro movements across the border. Equines which have recently come from the Transvaal and are returning thither.

Racehorses in training will be allowed to proceed to their destination upon the owner giving an undertaking to report their arrival to the Government Veterinary Surgeon of the District, and to submit the imported animals to the mallein test if the Government Veterinary Surgeon considers this necessary. All other equines will be detained and tested unless the owner has previously made other arrangements with this Department.

No 3 —SHEEP

Sheep are subject to examination at the Port of Entry and liable to detention if found affected with Scab

No 4 —PIGS

Pigs from Cape Colony are now allowed to enter the Transvaal if the following conditions are observed —The person desiring to introduce swine into this Colony from Cape Colony shall make application to the Director of Agriculture Pretoria, stating the place from which and the person from whom the swine are being obtained, and giving particulars as to their number destination, and the purpose for which they are being introduced, he shall further submit with such application a certificate signed by the Chairman of local authority of the District from which the animals are to be brought and endorsed by the Chief Veterinary Surgeon or his representative, to the effect that such swine are free from swine fever and that there has been no swine fever in the place from which they have been immediately obtained

Upon receipt of such documents the Director of Agriculture may grant and transmit a permit authorising the introduction of such swine Such permit shall be sent with the animals, and shall be handed over to the Stock Inspector at the Port of Entry

Permits for the introduction of pigs from other Colonies are not required

C E GRAY,
Principal Veterinary Surgeon

Department of Agriculture, Pretoria

The Introduction of Swine into the Orange River Colony.

The following conditions regulating the introduction of swine into the Orange River Colony as recently modified by the Government, are published for general information

D HUTCHEON,
Chief Veterinary Surgeon

Office of the Chief Veterinary Surgeon
Cape Town, 10th July, 1905

No 7

PROCLAMATION No 57 OF 1905.

Whereas it is desirable to remove certain restrictions imposed upon the importation of swine from the Cape Colony by Proclamation No 11 of 1904

Now therefore, under and by virtue of the powers in me vested by the Animal Diseases Ordinance No 13 of 1903, I do hereby proclaim declare and make known as follows —

1 Proclamation No 11 of 1904 is hereby repealed

2 From and after the date of this Proclamation it shall not be lawful to introduce or import swine into this Colony from the Cape Colony except under the following conditions —

(a) The importer of such swine shall at the place of entry into this Colony produce a certificate signed by the Chief Veterinary Surgeon of the Cape Colony or his representative at Cape Town that such swine are free from disease and that the area in the Cape Colony from which they have been conveyed is not infected with Swine Fever

(b) The importer of such swine shall before importation apply to the head of the Veterinary Department of this Colony at Bloemfontein for permission to import and shall state in his application from whom and from what place such swine were obtained their number, description and destination.

3 Any person contravening the provisions of this Proclamation shall be liable to a fine not exceeding one hundred pounds, or in default to imprisonment with or without hard labour for a period not exceeding twelve months

4. Any swine introduced or imported into this Colony in contravention of this Proclamation shall be confiscated and destroyed

GOD SAVE THE KING!

Given under my hand and seal, at Bloemfontein, this 5th day of July, 1905.

H. GOOLD-ADAMS,
Lieutenant Governor.

By command of His Excellency the Lieutenant-Governor.

B T BLACKWOOD,
Acting Colonial Secretary.

Ports of Entry into Orange River Colony.

The subjoined corrected list of Ports of Entry for Live Stock from the Cape Colony into the Orange River Colony, together with the conditions imposed by that Colony, is hereby published for general information, and will replace my notice of the 26th ultimo.

D. HUTCHEON,
Chief Veterinary Surgeon.

Office of the
Chief Veterinary Surgeon,
Cape Town, 13th July, 1905.

No 8.

Ports of Entry for Live Stock

1 Frere Road Bridge
2 Bethulie Road and Railway Bridges
3 Norval's Pont Railway Bridge
4 Colesberg Road Bridge
5. Dalton's Pont on the farm Welgedraai, Division of Fauresmith
6. The farms Ramah and } in the Division of Jacobsdal
7 Karreelaagte, }
8 The farm Rosebery Plain (Welgevonden), for the Division of Kimberley
9. The farm Rietpan and } for the Division of Boshof
10 The farm Charlottesdal, }

REGULATIONS.

1. Orange River Colony Ordinance No. 52, of 1903, and Proclamation No. 3, of 1904, prohibit the introduction of any horse, gelding, mare, colt, filly, donkey, mule, bull, ox, cow, heifer, calf, sheep, goat, or ostrich into the Orange River Colony, unless the owner shall have first obtained a certificate as hereunder set forth.

2. The certificate necessary before any of the abovementioned animals can be permitted to enter the Orange River Colony is that set forth in Annexure "A" hereto, issued and signed by the Resident Magistrate, Justice of the Peace, Field-cornet, Veterinary Officer or Inspector of Sheep of the District in the Cape Colony from which such animals have come.

3. The person in charge of such animals is liable to be called upon to produce the certificate aforesaid to the Inspector of Stock at any of the Ports of Entry abovementioned, or any Justice of the Peace, Police Officer, or owner of land over which such animals may pass or be passing.

ANNEXURE "A."

I........ .... do hereby certify that the animals herein specified (horse, gelding, mare, colt, filly, donkey, mule, bull, ox, cow, heifer, calf, sheep, goat, or ostrich) are free from infectious or contagious disease, and have not been in contact with infected animals, and to the best of my knowledge and belief have not come from or through a locality where any such disease is known to exist, viz. :—

Number and general description

Place from which sent ... .

Owner's Name and Address......

Name of Person in charge ....

Place in the Orange River Colony to which animals are sent......... .. ..

Signature of Resident Magistrate, Justice of the Peace, Field cornet, Veterinary Surgeon or Inspector of Sheep of the District in the Cape Colony from which such animals have come ....

Place . . ..

Date... .. ..

PIGS (COLONIAL AND IMPORTED).

The introduction of Colonial bred Pigs into the Orange River Colony from Cape Colony is regulated by Government Notice No 7 of 10th July, 1905 Pigs imported into Cape Colony by sea, may be introduced into the Orange River Colony, provided that,—

(*a*) Such Pigs are conveyed direct from the port of landing to the Orange River Colony in closed trucks, such trucks having been properly disinfected at the port of landing, and

(*b*) A certificate signed by a qualified Veterinary Surgeon at the Port of landing that such Pigs were landed free from disease, and that the trucks in which they are conveyed were properly disinfected, accompanies each consignment and is produced at the Border Station

Nurseries Inspection and Quarantine Act, 1905

The public are notified that, in terms of Section 3 of the Nurseries Inspection and Quarantine Act, 1905, every nursery of trees or plants of any kind (not being vegetables) grown or cultivated for the purposes of trade, or distributed for the purpose of being grown elsewhere than on the premises on which they stand, has to be registered on or before the 1st September next.

Before this date, or until the nursery concerned has been inspected under the provisions of the Act, no restriction will be placed on the movement of nursery stock.

Application for registration should be addressed to the Government Entomologist, Department of Agriculture, Cape Town, either direct or through the Resident Magistrate or Assistant Resident Magistrate of the District in which the nursery is situated ; and should state .—

(1) Whether the applicant is the owner or occupier of or the party responsible for the nursery

(2) What kind of nursery business is conducted by him—whether confined to fruit trees, to forest and ornamental trees, etc., to vines, or to florist's plants

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town

Agricultural Miscellanea, price 6d each Extracts from Vols. I. to V of *Agricultural Journal*

Stock Farming, Artificial Grasses and Fodder for Stock, Ensilage, Dairying, Treatment of Cereal and other Crops, Viticulture and Wine Making; Forestry Locusts and their Destruction, Possible New Industries for Cape Farmers

Agriculture

Wheat Production in Australia (1s 6d) by A C Macdonald, *Wheat Production in Australia (1s 6d) by W Halse and J D J Visser, Hop Cultivation (3d) translated by A W Heywood, *Agricultural Weather Forecasts (1d), *Brak Land in Relation to Irrigation and Drainage (1d) *Poultry Raising (1d), Tobacco Cultivation by Schenck, (3d), Tobacco Cultivation by Bornemisza (1d) The Velvet Bean (1d) Potato Disease (1d) Scheme of Manurial Experiments (1d.), Leguminous Forage Crops for Trial in Cape Colony (1d); Grasses for Trial in Cape Colony (1d) Sundry Forage Crops for trial in Cape Colony (1d) Poultry in South Africa Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d) The Salt Bushes (d)

Dairying.

Dairy Breeds by A C Macdonald (9d) *Dairy Industry in Great Britain by A C. Macdonald (6d) †Dairy and its Products by D Hutcheon (2d), *Dairy Industry in Denmark (2d), Ready Reckoner for Cream Testing (1s), †Butter and Cheddar Cheese Making (1d)

Entomology

The Bont Tick (1d) Bean Bruchus 1d , Cabbage Aphis (1d), Codling Moth in Madeira Fruit (1d), *Codling Moth (1d), Citrus Psylla (1d), Fruit Fly (1d), Fumigation Supplies (1d), *Cyanide Gas Remedy for Scale Insects (3d), †Hessian Fly (1d) Insect Friends and Foes (1d), Methods of Locust Destruction (1d), *Peach Yellows (1d), Pear Slug, Paris Green (1d), Remedy for Mestwurmen (1d) *Spray Calendar (1d) *Spray Pump Notes (1d) Scale Insects on Ornamental Trees and Plants (1d), Two Pine Apple Pests (1d), Tree Fumigation in California (1d) Winter Spraying (1d), Wattle Bag Worm (1d) Bordeaux Mixture (1d) Deaths Head Moth Superstition (1d), Fumigation under Box Covers (1d), The House Fly (1d), Revised Plant Import Regulations (1d) New Oak Tree Pest (1d) Nursery Inspection and Quarantine Bill (1d), Oil Water Pumps (1d), The Plague of Ticks (1d), Potato Tuber Moth (1d), Treatment of Buildings with Hydrocyanic Acid Gas for Destruction of Vermin (1d), The Codling Moth, Notes on its Life Cycle and Remedies (1d) Gall Worms in the Roots of Plants (1d), The Fruit Fly,* (with coloured plates) (3d), *Gas Treatment for Scale Insects (3d), Another Introduced Scale Pest (1d) Washes for Red Scale (1d.), Fruit Fly Peach Fly (1d) Lime Sulphur Salt Wash for Scale Insect (1d), Cyanide Gas Fumigation (1d), The Fruit Moth 1d), Fusicladium of the Apple and Pear (1d) Mealie Stalk Borer (3d)—*coloured plate* Cleaning up Nursery (1d) Natural Enemies of the Fruit Fly Report on Investigations in Brazil (1d)

Forestry

British National Forestry (1d), Botanical Observations on Forests in Eastern Pondoland (1d), Elementary Principles of Sylviculture or Woodcraft (1d.) National Forests (1d), Tree Planting (5d), *Tree Planting for Farmers (1d.); Indigenous Timbers of the Cape (1d), Misuse of Coal and the Uses of Forests (1d), Tree Planting for Timber and Fuel (1d)

Note.—All those marked with * are obtainable in Dutch and English.
† Dutch only

Fisheries

Trout and Carp Breeding and Stocking of Streams (1d), *Methods of Preserving Fish by Smoking (1d), Portable Floating Hatching Box for Trout Ova (1d.)

Horticulture.

Fruit Culture in the Gamtoos River Valley (1d), *Marketing of Fruit (1d), Manual of Practical Orchard Work at the Cape (6d), The Olive at the Cape (2d), Tomatoes and Fruit for Export (1d), Citrus Culture in Cape Colony • Report of the Citrus Commission (1d), *Fruit from Orchard to Buyer (1d), Netting for Fruit Trees (1d), Fruit Culture in Argentina (1d)

Veterinary and Animal Industry.

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d), Diseases of the Horse and their treatment (1s), Horse Sickness (2d), * Heartwater (1d), * Liver Disease among Calves (3d), Lungsickness of Cattle (1d), * Malarial Catarrhal Fever of Sheep (1d), *Preventive Vaccination against Anthrax and Swine Fever (1d), Rinderpest Dr Koch's Report (1d), *Inoculation against Rinderpest (1d), Dr Kohlstocks Report on Inoculation for Rinderpest (1d), *Redwater, Texas Fever or Tick Disease (1d), *Redwater, Anthrax and Quarter Evil (1d), †Scab and its Nature (3d), *Sheep and Wool (1d), Treatment for Worms in Domestic Animals (1d.), †International Conference of Sheep Breeders (1d), The Eye and its Diseases (1d) Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.), Heartwater in Calves (1d.), Tick Heartwater Experiments (1d), Indigestion and Diarrhœa in Calves (1d), Persian Sheep and Heartwater (1d), Poisoning of Stock (1d), Retention of the Fœtal Membrane, or Afterbirth in Cows (1d), Stijfziekte, Lamziekte or Osteo Malacia and Paralysis (1d) Transmission of African Coast Fever (3d), Tuberculosis and the Use of Tuberculin (1d) African Coast Fever with Description of Dipping Tank (3d), Notes on the so called Paralysis Tick (1d), *Rinderpest in South Africa (3d) by D Hutcheon, *Fluke or Slak in Liver of Sheep (3d)—*coloured plate*, *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d), Osteo Porosis (3d)—*coloured plates*, *Glanders (3d)—*coloured plate*, *Animal Castration (1d)

Viticulture.

†Reports on Viticulture (3d), *Reconstitution of Phylloxerised Vineyards (1s), Report on Failure of Hanepoot Grapes on American Vines (1d) The Making of Wine and its By Products (6d), How to Treat Wine Casks (1d) Failure of Vines 1d)

Miscellaneous

Game Seasons (3d), Land Laws of Cape Colony (1d) *Monsonia the Cape Cure for Dysentery (1d), *Rainfall of South Africa (1d), Sand Dunes of Gascony (6d), The Metric System (1d), South African Stud Book, Constitution, Rules, &c., Transvaal Plant Import Regulations (1d)

NOTE —All those marked with * are obtainable in Dutch and English
† Dutch only

THE PRODUCE MARKET

CAPE TOWN.

Mr. R. Müller supplies the following report for the month ending August 19th 1905:—

Wool.—It being now between seasons, nothing except odd lots were offered during the month in Grease Wools. In Snow White rather a brisk business has been done, and some very good parcels were submitted, meeting generally with a good competition. Prices are, however, a little easier than last month. Extra Supers may be quoted from 1/7½ to 1/9½. Supers from 1/4 to 1/7½. Seconds from 1/1 to 1/4 according to quality.

Final Reports from the London Sales are somewhat disappointing as regards Cape Greasies heavy wasty lots were neglected, and in some cases had to be withdrawn.

	s.	d.	s.	d.		s.	d.	s.	d.
Super Long Grass Veld Wool	0	8	0	9	Short and Inferior ..	0	4	0	5
Super Long Karroo Veld Wool	0	6¾	0	7½	Wool for Washing ..	0	4½	0	6
Medium Karroo Veld Wool	0	5	0	6	Snow-white Super to Extra	1	6	1	10½
					,, Ordinary	1	2	1	6
					Fleece Washed ..	0	9	0	10

Mohair.—The Market remains quiet, and only a limited amount of business has been done. Reports from Bradford shew that, although there is little business doing at the moment, the undertone is good and, as far as can be judged, the ultimate prospects appear favourable.

	s.	d.	s.	d.		s.	d.	s.	d.
Mohair, Firsts, Summer	1	0	1	2	Mohair Winter ..	0	10	0	11
,, Kids.. ..	1	3	1	5	,, ,, Kids..	1	0	1	1
,, Seconds ..	0	6½	0	9½					

Ostrich Feathers.—The London Sales closed last month, and final news are somewhat disappointing to shippers Whites, Feminas, Long Blacks and Drabs, Fancy and Floss were lower. White Tails realised higher prices. Other descriptions remained about par.

Good quality pluckings are wanted and realise fair prices.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Primes	10	10	0	35	0	0	Floss ..	0	5	0	1	10	0
Firsts, Ordinary to Super ..	8	0	0	10	10	0	Long Drabs ..	2	10	0	4	10	0
Seconds ..	6	0	0	8	0	0	Medium Drabs..	1	5	0	1	15	0
Thirds ..	3	10	0	5	0	0	Short to Medium	0	10	0	1	10	0
Femina (super)	7	0	0	10	0	0	Floss ..	0	2	6	1	10	0
Femina, Seconds to Firsts ..	4	0	0	6	10	0	White Tails ..	1	5	0	1	15	0
Byocks (fancy) ..	5	0	0	7	10	0	Coloured Tails..	0	5	0	1	10	0
Long Blacks ..	4	10	0	7	10	0	Chicks ..	0	1	0	0	2	0
Medium Blacks	3	0	0	3	10	0	Spadonas ..	2	10	0	4	0	0
Short to Medium	0	10	0	2	10	0	Inferior Black & Drabs, Short to Long ..	0	0	6	1	10	0

Skins and Hides.—There is a tendency to slightly lower prices in Wool Skins; other descriptions are unchanged. There is a good enquiry for all classes.

PORT ELIZABETH.

Messrs. John Daverin and Co., report under date August 18, 1905:—

Ostrich Feathers.—Our market was only moderately supplied this week with an indifferent assortment; competition was very irregular, and prices ruled quite 5 to 10 per cent lower than they were three weeks ago. There has been little business done out of hand, buyers showing no inclination to operate except at prices which owners will not entertain. The total quantity sold on the public market amounted to £4,472 17s. 10d., and weighed 2,534 lbs. 1¼ ozs.

	£	s	d	£	s	d		£	s	d.	£	s	d.
Primes. Extra super				Special Prices			Blacks. Long	3	0	0	4	10	0
Good to super	8	10	0	12	0	0	Medium	1	5	0	2	10	0
Whites: Firsts	6	0	0	8	0	0	Short	0	10	0	0	15	0
Seconds ..	3	10	0	5	5	0	Wirey	0	1	0	0	1	6
Thirds ..	2	5	0	4	0	0	Floss	0	6	0	1	5	0
Feminas Tipped							Drabs. Long	1	10	0	2	10	0
and Grey ..	4	0	0	6	10	0	Medium	0	12	6	1	5	0
Seconds ..	2	5	0	3	15	0	Short	0	2	6	0	6	0
Thirds ..	1	10	0	2	10	0	Wirey	0	0	6	0	1	0
Fancy ..	4	0	0	6	0	0	Floss	0	6	0	1	5	0
Tails, White ..	1	5	0	2	0	0	Spadonas. Light	2	0	0	3	10	0
Light ..	0	17	6	1	5	0	Dark	0	12	6	1	12	6
Coloured & Dark	0	5	0	0	12	6	Chicks	0	0	3	0	1	6

Wool —This market remains firm, and the small lots of new season's grease arriving sell readily at full current prices On the public market yesterday only a few bales were offered, prices shewing no change

Snowwhite Extra Superior ..	20d	20½d
Snowwhite Superior ..	17½d	19d
Do Good to Superior	16½d	17d
Do Inferior Faulty	15½d	16d
Grease, Super Long, well conditioned, Grass veld grown, special clips	7d	8d
Grease, Super Long well conditioned, Grass veld grown .	6¼d	7d
Grease, Super Long, well conditioned Karroo Grown ..	6d	6½d
Grease, Super Long, well-conditioned, Mixed Veld .	5¾d	6¼d
Grease, Light, faultless, medium, Grassveld grown .	6d	6¼d
Grease, Light, faultless, medium Karroo grown	5½d	6d
Grease, Light, faultless, short Karroo grown	5¼d	6d
Grease, Short, faulty and wasty ..	4½d	4¾d
Grease, Coarse and Coloured ..	5d	5½d
Scoured, Coarse and Coloured ..	6½d	10½d
Free State Grassveld Grease, long and well conditioned ..	6¼d	6¾d
Free State medium grown, light, with little fault ..	5¼d	5½d
Free State short, faulty and wasty ..	4½d	5d
Free State Karroo grown, long and well conditioned ..	5¼d	5¾d
Free State medium grown, light, with little fault ..	5d	5½d
Free State short, faulty and wasty ..	4½d	4¾d

Mohair —This market continued very quiet during the week until to day, when one of our Bradford buyers came into the market with an order for firsts at 14d, which we hope will be the commencement of an active demand On the public market on Tuesday a fair quantity was offered, prices shewing no change from those paid last week

Superior Firsts special clips	14½d
Ordinary Firsts	13½d
Long Blue O R C Hair	None offering
Super Kids ..	17½d
Ordinary Kids ..	15d to 16d

Mixed Hair	0s 10½d	0s 11¾
Seconds and Grey	0s 8½d	0s 9¼d
Thirds .	0s 6d	0s 6¼d
Winter	0s 10½d	0s 11d
Do Kids		0s 13d

Skins —This market is decidedly weaker, and prices of sheep, goat, and angora skins have each declined a farthing Sheepskins sold in bundles at 6¼d per lb, Pelts at 4¼d Capes, 1s 7d, damaged, 6d each, Angoras, 6¾d, Shorn, 4¾d, damaged, 3¼d, Goat, 10¾d, damaged, 5¾d per lb, Springbok, 8d each

Hides —Sun-dried Hides sold this week at 7½d, and for damaged, 5¾d, Drysalted, 6¾d; damaged, 5½d, and thirds, 3½d.

THE

Agricultural Journal

OF THE CAPE OF GOOD HOPE.

No. 4 OCTOBER 1st, 1905 VOL. XXVII

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All communications should be addressed :
"The Editor, Agricultural Journal, Department of Agriculture, Capetown."
Telegraphic Address : "Bulletin," Capetown.

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NOTES.

Wanted Back Numbers.

Any of our readers having copies of the *Agricultural Journal* for July last (Vol. XXVII, No. 1) to spare, will greatly oblige by forwarding same to this office, addressed to the Editor.

Show Dates.

So far no official list of Show fixtures for next year has been arranged, the Agricultural Union having overlooked that matter. Several new societies are asking for vacant dates, and we would be glad if secretaries could forward their fixtures, so that we could publish them in the usual course, and thus avoid clashing as far as possible. It is presumed that the older societies will stick—on or about—to their last year's dates, and thus allow the new-comers to fit themselves in at their own convenience. With a general break-up of the drought, there should be a very full list of Shows next year, as the country is fully ripe for really keen competition in every way.

Malmesbury has fixed its first Show for the 21st of February; Worcester has selected the 12th of February, and Swellendam the 7th of February.

King William's Town Agricultural Show.

It is gratifying to learn from the Secretary to the King William's Town Agricultural Society (Mr. Cyril H. Rushton) that there is every probability of a Show being held at that centre in March next, though the exact dates have not yet been fixed. It will be remembered that this and the East London Show were both dropped last year on account of the drought, but with the promising season now before us there should be little fear of a recurrence of such an experience. A large number of exhibitors were disappointed last year, for the Border Shows fill up a serious blank in the season. We trust they will take this intimation and prepare their best for the great occasions, as we also trust to see a complete list of Border fixtures appearing before long.

Arsenite of Soda as a Tick Destroyer.

Under the heading of "Cattle Dipping Mixtures" in another part of this issue will be found an article of great interest and importance to all interested in the engrossing question of tick eradication. Mr. Edmonds, of Kei Mouth, is not the only farmer who is concerned with the question of cost where dipping is concerned and the announcement of the success the Veterinary Branch has met with in testing Arsenite of Soda for this purpose should be welcome to many. A careful perusal of the memorandum by Mr. Hutcheon, C.V.S., and the reports attached in the article mentioned, will shew that the commercial article, obtainable at 3d. per lb., has shewn itself satisfactory for the purpose. The question of cost is very important, for 1,000 gals. of the Arsenite of Soda Dip can be made up, with comparative ease, for a sum not exceeding 12s. 6d. This compares more than favourably with other dipping compounds on the market, and as it has proved to be, experimentally at least, both effective in tick destruction and innocuous to the animals experimented with, there is no reason why its use should not become general. Of course every care must be exercised as with all arsenical preparations.

Caledon Wool Sales.

The Caledon Wool Sales, under the auspices of the Caledon Agricultural Society, will be held on the 2nd of November, 1905. At the 1904 sales some 1,000 bales were offered. As everything points to this year's clip being a record one, the Society anticipates that the amount of wool submitted will be considerably in excess of last year's figures.

Inter-Colonial Agricultural Union.

A session of the newly-formed Inter-Colonial Agricultural Union is to sit at Maritzburg at the end of this month, when delegates from the Cape Colony Agricultural Union will be present. Among the subjects listed for discussion are the following .—

Combined action by the different Governments and administrations with regard to all infectious and contagious diseases among stock.

The establishment of a South African Laboratory for scientific research and investigation of diseases among live stock, &c.

United action by the several South African Colonies with respect to the destruction of locusts.

That the several Governments and Administrations of South Africa should be approached with a view of establishing a university for South Africa in order that diplomas in law, science, medicine, &c., may be obtained in South Africa.

Uniform rates for Colonial produce over the whole system of South African Railways.

Standard weights and measures throughout South Africa, all produce sold on the public markets to be sold by such standards. Also the introduction of the "metric system."

That the suspended duty on meat should be reimposed, where this has not already taken place.

Uniform action in respect of the regulation of the native labour supply for agricultural purposes.

That a uniformly stringent Scab Law should be enforced in each Colony.

That an Inter-Colonial Agricultural Journal should be published at stated intervals.

That the present Customs Union is not beneficial to the community in general.

Port Elizabeth Agricultural Society.

At the annual meeting of the Port Elizabeth Agricultural Society held during last month some interesting facts were disclosed, not the least interesting being that this flourishing Society has had another successful season. During the past year the Society has further improved the ground by completing a properly made road at the principal entrance gate, and the planting of about 1,800 trees in different parts of the yard, which, in a few years, will not only add to its beauty but also provide shelter to the visitors attending the Show. A new building was also erected, costing about £1,400. The necessity for this building was shewn at the last Show, as it was fully utilised for wool, mohair, feathers and vehicles, and also as a refreshment room. The total cost of improvements for the year was £2,820. The report concludes by again requesting kindred societies, farmers' associations and all friends to send in such suggestions as, in their opinion, would improve the prize list and make it more useful; while thanks are offered to the exhibitors for sending their exhibits, the judges for their services, and citizens of Port Elizabeth and others for their liberal donations towards the funds of the Society.

The President (Mr. M. M. Loubser), who, by the way, was re-elected for the ensuing year, stated that the Society intends this year to carry out certain further improvements, one of which was to move the present seats round the horse ring farther back nearer the horse sheds and to enlarge the ring, when they would have the largest horse ring and the best seating accommodation in South Africa. When the proposed improvements were effected they would have one of the finest Agricultural Show Yards not only in South Africa, but, and those who had visited the Mother Country and seen the Shows there would bear him out, when he said they had got accommodation which would compare very favourably with any Show at Home or here.

Co-operation in Agriculture.

The arrival of Mr. Hannon, the expert in co-operation brought out specially by the Government to explain the systems adopted in other countries more fully to our farmers in order to get them to appreciate the new movement at its full value, carries us another step nearer the goal. Mr. Hannon will have made the acquaintance of many of our farmers by the time these lines are published, and they will be able to judge for themselves what kind of man he is. We believe he will make a favourable impression mainly because he is deeply convinced that in co-operation lies the secret of the success of modern agriculture. In this Colony co-operation can be made to mean so much if successfully handled that most people are hesitating at the prospect opened up. The great feature of its immediate effects should be to so organise our agriculturists as to bring about some effort to at least check the flow of imported foodstuffs into the country. This can only be done by production, we know, and that largely depends upon individual energy, but when a man knows that his work is likely to be rewarded owing to the careful organising of the industry in which he is engaged and there is less fear of his markets suddenly falling or becoming glutted owing to bad management, he is the more likely to put forward all his strength than in circumstances in which these things are not only possible but the general rule. Co-operation should teach our producers to regularise their output and keep things at a fair level instead of the fluctuating conditions which maintain so largely in this country. And it is only by reasonable co-operation and control that these things can be effectually accomplished.

Stud Stock for the Orange River Colony.

The Legislative Council of the Orange River Colony during its last Session placed a sum of £15,000 apart for loans to Farmers' Associations to enable them to procure thoroughbred Merino sheep and Angora goats. This fact was communicated to the Agricultural Department of this Colony by the Director of Agriculture at Bloemfontein (Mr. W. J. Palmer) with an intimation from the Lieutenant-Governor that if this stock could be obtained in South Africa from individuals who, during past years, have imported thoroughbred stock, and who are now breeding sheep and goats suitable to the country, it might be a benefit to both purchasers and producers if the O.R.C. Government had definite information on that point. With this object in view, His Excellency thought it might be advantageous if a delegation of two or three O.R.C. sheep farmers could be selected to inspect certain stud flocks in the Cape Colony with a view to reporting as to their breeding, probable purchase price, and other details which might be of use to Farmers' Associations wishing to purchase. Mr. Palmer, therefore, enquired whether it was thought that the owners of such flocks in Cape Colony would be prepared to receive these delegates, and, if so, whether they would provide them with the necessary transport from the nearest railway station, and their lodgings during the time they happened to be on the farms.

This matter was passed to the Veterinary Branch to deal with and as a preliminary a number of the better known stud-breeders were circularised, and asked if they were willing to comply with the suggestion. So far every answer has been favourable, for it seems to be generally recognised that a mutual benefit might be conferred. Among those who have answered are the following:—Messrs. T. W. King, of Bedford; A. A. Hockly, Cullendale, Bedford; S. J. Marais, Smoorfontein, Dordrecht; C. Adams & Son, Tarkastad; J. G. Sieberhagen, Richmond; J. H. King, Tarkastad; Geo. King & Sons, Tarkastad; G. A. Rogers, Cathcart; William Rogers, Glencairn, Cathcart; H. L. Dugmore, Glencairn, Cathcart; Geo. Blaine, Kei Road; F. W. Southey, Hillmoor, Steynsburg; Painter & Leonard, Bedford; C. Cawood, Mortimer; T. E. Hobson, Ebenezer; R. C. Holmes, Kendrew Station; R. Pell Edmonds, Ripplemead, Kubusi; T. W. King, Bedford; C. G. Lee, Klipplaat; W. Berrington, Jansenville; Geo. King & Sons, Bedford; A. J. Vermaak, Vermaak Siding; F. C. Bayly, Deelfontein; E. A. Petersen, Middleton; W. E. Murray & Sons, Graaff-Reinet; H. Hilton Barber, Hales Owen, Cradock; A. H. Murray, Portlock, Graaff-Reinet; Arthur Forbes, Schoombie; P. Weyer, Darlington; T. T. Hoole, Atherstone.

As it is not possible to reach every breeder of stud stock in the Colony by circular, this matter is now made public in order that those who may be desirous of taking advantage of the opportunity thus afforded may send in their names to be added to the list. All the names and addresses with particulars as forwarded are being sent to the authorities at Bloemfontein, and to secure entry upon the list it is only necessary for breeders of Merino and Angora stud stock to communicate the facts to the Acting Director of Agriculture, Cape Town. There is no reason at all why a large proportion, at least, of this sum, should not be kept in this country, if not the whole of it, for those who know the stud flocks of this Colony best are quite convinced that when animals suited to the special climatic conditions of South Africa are wanted they can best be supplied here.

Three Flowering Trees at Tokai.

Tokai is remarkable this spring for a fine display of flowers on three trees. Perhaps on account of the dry spring, the beautiful and sweetly scented Cape pea tree *Podolyria calyptrata* is more remarkable than usual. This winter and early spring have seen the first good show of a new Crimson flowering Gum, of which the seed was received some years back from South Australia. It goes by the cumbersome botanical name of *Eucalyptus leucoxylon* var. *macrocarpa* var. *rosea.* On the main mountain road at Tokai is a patch of larger flowered crimson Leucoxylon gums which this winter have flowered on a large scale for the first time, and they certainly present a brilliant spectacle. The crimson flowers are as large as those of the ordinary crimson flowering gum, which now light up the suburbs of Cape Town at mid summer. But the crimson Leucoxylon gum has the flowers not in a terminal bunch, but disposed along the sides of the spray-like foliage. It contrasts again in its flowering period with the older crimson flowering gum. *Eucalyptus ficifolia* has crimson flowers occasionally in spring, but its flowering period is midsummer. The flowering period of the new crimson gum is in winter or early spring. The ordinary small-flowered Leucoxylon gum will show here and there a red-blossomed tree amongst the white-blossomed trees. This is well seen in Mr. Logan's avenue at Tweedside, where the Leucoxylon gum is growing vigorously and well.

Another tree flowering at Tokai for the first time this spring is *Acacia binervata.* This is a particularly handsome tree; in general appearance, somewhat resembling a well-grown Blackwood, with foliage of a brighter green and more diffuse. The flowers resemble those of Blackwood, but are larger and more abundant. The white sprays of flowers are both handsome and sweetly scented. As its name indicates, this tree is remarkable for the leaf having two large veins. These two large veins are so conspicuous that the tree can always be recognized by them, a useful feature amongst the Australian Acacias where so many of the different species resemble one another very closely.—D E.H.

Vegetable matter in Wool.

The Bradford Chamber of Commerce has forwarded to the Cape Town Chamber of Commerce a copy of a circular letter on the above subject in which they say:—"Spinners and manufacturers complain that increasing quantities of vegetable matter, such as fragments of hemp, jute, string, straw, dried grass, etc., are found in colonial and foreign wools. This appears to be due in some cases to the sheep being shorn and the fleeces wound in places where fragments of grass, straw, etc., are littered about, and in others, and more largely, to the string and the hemp or jute material used in packing the wool for shipment, this material, moreover, being said to be inferior to that used some years ago, inasmuch as it appears to be more loosely spun and woven, and is consequently more easily frayed.

"During handling—in shipping, unshipping, warehousing, etc., —the bales become more or less damaged, and fragments of the bagging and sewing twine get intimately mixed with the wool. Owing to the colour being practically the same, these fragments are very difficult to detect. Should they not be detected and removed when the wool is "sorted," they not only become as white as the wool itself during the subsequent stages of scouring and combing, but are also reduced to small particles and distributed more thoroughly among the wool. It is practically impossible to detect their presence in the Top or Yarn. They consequently become incorporated in the woven piece, and are not visible until the piece is dyed and finished. Vegetable fibres absolutely refuse to take the dyes used for wool; consequently when the pieces are dyed and finished these particles of vegetable matter appear in black goods as tiny white streaks, and in goods of other shades they are also easily perceived. The value of the finished article is seriously depreciated.

"Some of the principal remedies suggested are, (1) that care should be taken to see that no grass, straw, &c., is wound with the fleeces; (2) that as far as practicable the bales should be cut open at the seams; where that is not done care being taken to so cut the bagging as to damage it as little as possible in order to minimize the fraying of the loose ends; (3) that the bagging should be paper-lined (*i.e.*, that it should consist of a double texture, bagging on one side and paper on the other) so as to prevent detached fragments of the bagging from getting into the wool; and (4) that the string used for sewing up the bales should be dyed *black*, so that if any fragments get into the wool they may be more readily detected and removed during sorting. We are desired to impress upon you the importance of these matters and to request that you will bring them before persons interested in the question with a view to the remedying of the evils complained of, which will be to the advantage of all parties concerned.

FARM AND VELD.

The Weather.

After many months of weary waiting the prolonged drought at last shews signs of breaking. The greater part of South Africa has been blessed with rain during the past month, several districts having been seriously flooded, and considerable damage was done, attended by, it is reported, the loss of stock and human life. The south coast as far east as the Gamtoos River, including a large part of the Oudtshoorn Division has suffered most, the irrigable lands at Hankey and along the Grobbelaars and Oliphants Rivers having borne the brunt of the wild rush of waters poured down by the unprecedented rainfall. But though the rains have been heavy in some parts, and fairly evenly distributed over the Colony, there are still districts which could do with much more, notably in the north and north-east of the Colony. The western districts could do with more rain too if good cereal crops are to be reaped. However, the prospects all round have brightened wonderfully with the change in the weather and as it has come about exactly at the right time of the year, hopes are high that our farmers have at least one good season before them at last, with the possibility of a series of good seasons to follow.

Castor Oil—Production in this Colony.

The constant appearance of the Castor Oil plant (*Ricinus Communis*, L.) as a weed in our waste lands has more than once directed attention to the possibility of its profitable cultivation for commercial purposes, but nothing very definite ever seems to have been attempted. There are initial difficulties in the way and an industrial problem has to be faced as well; but when it is considered that the Railway Department of this Colony alone spends some £8,000 a year on castor oil for lubricating purposes it looks as though there should be some prospect of a fair return if the question were tackled in a business-like manner. At least some effort might be made to keep this money in the Colony. Whether or not it would be possible for growers to handle this crop on a small scale we are not prepared to state at present; but, we understand, that the Railway Department is prepared, if it could obtain a supply of suitable castor oil produced in the Colony, to give a small preference in point of price over the imported article in order to encourage the industry. As a beginning an experiment as to the varieties most suitable to our conditions is to be initiated next year. This, however, can only deal with the cultural side, the industrial phase presents a more complicated problem.

Grafted Vines at Tokai.

Some interesting correspondence has passed recently between the Western Province Horticultural Board and the Superintendent of Tokai in connection with the Grafting of American vines at that institution. Mr. Orpen, the Superintendent wrote to the Chairman of the Board, stating that at the public sale of grafted vines held this year there was absolutely no demand for Reisling, Cabernet

Sauvignon, Shiraz, Malbec, Mataro, Raisin Blanc, or Barbarossa. In view of this, and the fact that it is so difficult to gauge the requirements of the different phylloxerised districts, he announced his intention this year to graft as large a number as possible of red and white Muscadel on Aramon, and Sultana on Metallica and Aramon, and Hanepoot on Jacquez; while if he could secure a sufficient supply of Jacquez cuttings he would also graft Pontac and Muscadel on this stock. This was referred to an advisory commitee, consisting of Messrs. D. De Vos Rabie, P. J. Cillie, C's son, and C. Mayor.

Mr. Rabie reported that he was present at the sale and noticed the principal buyers were the farmers from Worcester, Robertson and Montagu who work on Karroo soils and make sweet wines and raisins. He anticipates that Muscadel, Hanepoot, Pontac and some White French grapes will be bought next year. In districts like Goudini with loose soils, farmers mostly graft for themselves. But in the Karroo it is not possible to do this profitably owing to the nature of the soil. Mr. P. J. Cillie said he would certainly take the public sales as a guide what to graft for next year. He pointed out, however, that Karroo soils are not suited to Metallica as a stock. Experience in Paarl and Wellington teaches that Metallica only does well in a deep loose soil, and is not only a poor grower in stiff soils but goes back very soon. They have a few Muscadel plantations on Metallica in the Wellington District some years old doing fairly well. He has not seen Muscadel on Aramon Rupestris and would advise going slow until more is known of this combination. Pontac is doing well on Aramon in Wellington, and he advised the grafting of this on this stock and Metallica only, and not on Jacquez. Muscadel does first rate on Jacquez.

Mr. C. Mayer in a short memo said that it is generally admitted now that for the improvement of Colonial wines, especially red wine, other red grapes in addition to Hermitage must be used, and for this purpose Cabernet Sauvignon, Shiraz, Mataro and Malbec had been selected. He therefore recommended that no alteration be made in the proposed numbers, having regard also to the probability of the wine trade improving by next year, and thus stimulating buying again. He knows of several people in the Stellenbosch District who will buy these varieties if prospects improve. He maintains also that the number of Reisling should be grafted as this is a kind too much neglected by our farmers and one that will tend to improve the character of our white wines. He thought the whole of the Barbarossa might be substituted by Muscadel as suggested and the number of Hanepoot increased if sufficient Jacquez vines are available. As to stock suitable to Muscadel he knows a number of such vines doing well on Metallica, the grafts being a good number of years old. So far as he knows, no Muscadel has ever been grafted on Aramon Rupestris here. Pontac might also be included in the grafting operation at the cost of Cabernet.

The reference to Muscadel on Aramon Rupestris arose out of some correspondence with the Paarl Farmers' Association in which this was referred to. The matter was submitted to the Viticultural Expert, Mr. Dubois, who answered as follows:—I have no local experience of Muscadel on Aramon X Rupestris, but I may inform you that in France the graft bearers which have given the best results with Muscadel are in order of merit: Riparia X Rupestris 101-14; ditto 3309; and Rupestris du Lot. If Muscadel on Aramon X Rupestris has failed in this Colony, it is certainly not owing to disparity between the early growth of the one and the late growth of the other (a suggestion offered by the Paarl Farmers' Association) as it is definitely proved that this does not in any way affect the joint, but to some other cause, want of affinity most likely."

Valuable Tasmanian Sheep.

During the past month we were pleased to welcome back to South Africa Mr. T. T. Hoole, of Atherstone, in the Albany Division, who landed from the S.S. Ayrshire after a four months' trip in Australia. Mr. Hoole's ostensible object in visiting the Island Continent was to secure some good merino rams both for himself and others, and in that he seems to have succeeded. While in Sydney he attended the great sheep sales there and picked up some excellent representatives of the best blood in the country. Altogether he brought back with him upwards of thirty rams and ewes, all good and some of excellent character and pedigree. At the Sydney sales he bought on account of Mr. Abe Bailey for his Colesberg farms, one of the Gibson rams for £315, which is considered to be one of the best of the Gibson stud ever sent out of Australia. This ram was bred by the hon. James Gibson of Bellevue, Tasmania, and even after the long sea voyage looked exceedingly well. He is described as a special stud ram, is a son of Patron, who came of the world-renowned President strain. Patron is considered to be the best fine woolled merino ram ever bred in Australia, and we can only hope that his son Patron I, will rank as high. For a Tasmanian he is slightly on the robust side, but the fleece is density itself while the body is beautifully covered. We hope to see him again when he has had time to get over the voyage. Another fine ram is Cordite, a son of Amberite, the latter having been sold for 600 guineas, last year. He was bred by Mr. E. Gibson. Among the shipment are also 17 stud ewes from the Gibson Stud, all in excellent condition and almost perfect in symmetry and fleece. All the above were bought for Mr. Abe Bailey. In addition to these Mr. Hoole brought out some more Glengallons to add to his own stud flock at Atherstone. These include three rams and two ewes, the best available when he visited the station. He also brought with him seven rams of the Havila type, a class of sheep which, judging by appearance should do fairly well in our dry districts. They have good frames, fairly bulky, and are very symmetrical, while the fleeces though having a tendency towards robustness, show plenty of character and quality. These rams were purchased from Messrs. Suckling, Wright and the Peel River Co., and look a most useful class of sire. Altogether an excellent lot and we hope to hear more of them later on.

Sheep Dogs.

In addition to the sheep bought out by Mr. Hoole, that gentleman has managed to secure a well-trained sheep dog. The sheep collie is well-known in Australia for it does the work of a shepherd with the intelligence of a human being, but in South Africa, probably owing to the cheapness of labour, it has not attracted so much attention. "Lassie," the pretty bitch brought over by Mr. Hoole, is a first class worker, and that gentleman might do some good by showing her good points to the Highlands sheep farmers when he returns to Atherstone. The only trouble in sight would be with the sheep not being used to dogs.

Long-Woolled Persian Ram.

Woolled Persians in the Colony.

Messrs. Moss and Wardrop, of East London, the Colonial representatives of Cockbain, Hemelryk & Co., of London, the firm who secured the lifting of the embargo on the exportation of cattle and sheep from Persia, write stating that they have now received a sample lot of six sheep, this small number being sent in the first instance because they present an entirely new type to that at present known in South Africa as "Persians," viz., the black-headed hair-bearing breed, and it was desirable first of all to ascertain how this new type would be viewed by our farmers. This question has been very definitely settled, and in fact was a foregone conclusion, as the new kind not only eclipses the black-headed breed as a butcher's animal but in addition carries a very valuable wool.

The sheep are extremely hardy, quick-maturing and prolific, thriving on scanty scrub pasturage and in drought-stricken districts, but at the same time responding quickly to better veld conditions. One of the sheep recently arrived has been tested as to its resistance to Heartwater, by the application of pathogenic bont ticks, sent by the Agricultural Department at Cape Town for the purpose. The animal was most carefully watched during the experiment and no reaction was noticeable in any way. This result gives more than strong hope that the sheep as a breed are naturally immune to that terrible scourge. When once further numbers of these sheep have been secured it is proposed to submit one or two to the final test by blood injection, which, if successful, will put the matter beyond a doubt.

The photo. herewith gives a very good idea of the general appearance of the sheep, the ram represented being a 2-tooth sheep, and, as a matter of fact, the one subjected to the test above mentioned. This sheep was chosen for the purpose being the lightest bodied of any, but, as will be seen from the photo., the term "lightest bodied" is merely comparative, as he is a very fine, heavy, well-built sheep.

Mr. G. Root, a recognised wool expert, who has handled this special kind of wool for 20 years in England, inspected the consignment of sheep referred to and reports that the wool they carry is excellent both in quality and quantity, the eight months' clip being about 5 lbs. in weight. Taken all round, he says, the quality is remarkably even and he unhesitatingly expresses his hearty approval of the idea of introducing this sheep into South Africa, for which it is admirably suited. The breed, he adds, is very hardy, prolific, quick-maturing, and well suited to any districts subject to drought or where pasture is poor, besides being heavy in carcase and well suited for butchers' purposes. Messrs. Moss and Wardrop are at present in treaty for a considerable number of these sheep and hope ere long to be able to quote for them in large or small lots. Anyone desirous of further information on the subject, or who can arrange to inspect the sheep, should communicate with the firm at East London or with their Port Elizabeth office, P.O. Box 420, Port Elizabeth, where they have a couple also on view.

More Welsh Cattle.

Mr. R. Pell Edmonds, writing from England, says:—"By the *Berwick Castle* leaving here the 30th August, I am sending to Ripplemead three black Welsh heifers which I personally selected at the Welsh National Show held at Aberystwyth on the 1st August where they were placed third, reserve and h.c. Disappointment at the judging was freely expressed on the show-ground and two of these heifers, "Plas Alsi" and "Plas Kitty" were placed first and second at Llangefui the following week. These two come from Mr. Percy Jones's herd, and the third one, "Gwennie" was bred by Mr. J. Scourfield of Blaenwernddu, Whitland, South Wales. She is a model of symmetry which shorthorn breeders will find hard to beat. Following on my shipment of two years ago, it shews the estimation they are held in at Ripplemead.

Melotte Cream Separators.

The competition in Cream Separators is so keen that it must be highly pleasing to the patentee of the "Melotte" Separator, M. Jules Melotte, to see that his method of running a Separator Bowl, hanging from a Spindle which runs on a simple ball bearing, and is driven by an ordinary train of gear wheels, is being generally acknowledged to be the correct solution of the vibration difficulties. The "Melotte" with its self-balancing Bowl, and its few and unnumbered parts, easily put together by the most ignorant native, and so easily turned that one boy can work a 130-gallon machine for two hours, has evidently come to stay. During 1905 the machine swept the boards in every trial it competed in, beating almost all the other makes, and at the Maritzburg trials gave the extraordinary skim milk test of ·04 per cent. of fat left in, while producing a cream containing 42 per cent. of fat.

The Puzzle Monkey Tree in South Africa.

The Puzzle Monkey Tree, or *Araucaria imbricata,* mentioned in the September number, can be seen growing well in a few localities in the Cape Peninsula, but it does not thrive here, nor does it attain a great age. It flourishes best under the conditions of a winter rainfall and a moderate elevation. There is a plot of these trees in the arboretum in Tokai.—D. E. HUTCHINS.

Crop-bound Turkeys.

A Graaff-Reinet correspondent, writing on the 9th ult., says:—A curious disease has broken out amongst my turkeys, and I should be glad if you could enlighten me as to its cause and cure. The crops of the affected birds are quite hard, and they are enlarged to such an extent that they almost touch the ground. They eat readily, but seem to find it hard to swallow. The birds have been fed chiefly on mealies, but since the above symptoms became apparent they have received plenty of green food and bran.

The C.V.S., to whom the letter was referred offers the following comments:—Acute distention of the crop in poultry is usually due, either to persistent over-feeding, or to irregular feeding, and then permitting the birds to eat an excessive quantity when the appetite is keen. An over-feed of mealies would be particularly liable to act in this manner. After the bird has taken a good drink, which it invariably does after a full feed of grain; the mealies would swell up and distend the crop so that the muscular walls of that viscus would become paralysed and unable to contract upon its contents. In order to relieve the distended crop, when it is hard, a little warm water should be poured down the bird's throat, and the crop carefully and patiently kneaded with the hand until its contents become loose and movable. Some recommend to try and force some of the food up the œsophagus ejecting it through the mouth. I cannot recommend this operation, however. If the crop is so distended as to cause great distress, it is much better to make an incision about 1½ inch in length along the upper side of the crop, and carefully remove the contents with a small egg-spoon. After clearing out the the food, Wright ("The Book of Poultry." L. Wright) makes a very good suggestion, he says:—"pass the finger (greased, and with the nail pared), into the crop and feel for the outlet. It is quite possible that a bit of bone or other obstacle, may be causing the obstruction, which must then be removed." Clean and disinfect the wound carefully, and with a fine needle and silk thread, stitch it up. It is necessary to insert the stitches fairly close to one another, and embrace evenly the inner covering of the crop and the skin together in the same stitches.

But it is comparatively rare that any operation is necessary After manipulating the crop, as already described, give a dose of opening medicine. Many recommend Epsom salts, I prefer pills in the case of poultry, and invariably use calomel tabloids. Chickens require 1 grain tabloid, ordinary sized fowls 2 grains, and large fowls 3 grains. Young turkeys would require 2 grains, larger ones 3 to 4 grains according to age and size. If not relieved in 24 hours repeat the dose. Meantime place the sick birds in a separate pen, and give them no food, only water until the crop is relieved. The bird should then be fed sparingly; giving a very small quantity at each feed. Some recommend cooked food. I prefer a little grain, being less-bulky, and more nourishing, and allow them plenty of suitable gravel But, whatever kind of food is preferred, it must be given in very small quantities, and repeated only as it is digested. The supply must be stopped at once should any fullness of the crop re-appear. A little onion, or garlic, cut up, will stimulate digestion.

Zebus or Hump-backed Cattle in North Africa.

The fine hump-backed cattle of India are well known. For traction purposes they are unsurpassed. They pull with the pole on their necks against the hump, and when they come to be eaten the hump is the most delicate portion. Recently so-called "Zebus" or hump-back cattle have been introduced into North Africa. The following account of their success in Tunis is compiled from the *Bulletin Agricole de l'Algerie et de la Tunisie* for July last:—The ordinary cattle of North Africa crossed with the hump-backed cattle have yielded animals that are wonderfully hardy and vigorous; but the general crossing of North African cattle with the hump-backed cattle has been strongly opposed by Professor Sampson, and this has caused hesitation on the part of the Algerian Agricultural Department to recommend their general introduction. M. Houde at a recent Agricultural Congress gives an enthusiastic account of some of these crossed hump-backed cattle that he had seen at Siditabe in Tunis. He says that these cross-bred cattle are remarkable for their size, their strength and their hardiness. Two oxen harnessed to a military wagon trotted behind and kept up with a carriage drawn by two well-bred horses. In plowing, these cross-bred cattle are as fast as mules. They thrive on the dry poor fodder of the country, and get fat on straw. They furnish an excellent slaughter beast The trial of these cross-bred hump-backed cattle has now been going on for several years at Siditabe, and the authorities are so satisfied with the result that they wish to replace all their working cattle with the cross-bred hump-backed cattle.

A Veterinary Handbook.

Messrs. Gardner & Co, wholesale chemists of East London, King William's Town and Port Elizabeth, have issued a very useful Veterinary Handbook which gives a great deal of information in a compact form. To stock farmers it should prove of great value as it gives the bulk of approved methods of treatment for most of the ailments which afflict farm stock in this country. The publishing price is one shilling.

Irrigation Engineering.

Most of our readers will doubtless remember the interesting contributions of "Apex" on irrigation and cognate subjects and they will probably be pleased to learn that "Apex" is an engineer of some experience in this particular class of work. As a matter of fact "Apex" is Mr. Lawford, the Engineer of Mortimer, near Cradock, whose business announcement appears on another page in this issue.

EXTRA TROPICAL FORESTRY.

Being Notes on Timber and other Trees cultivated in South Africa and in the Extra-Tropical Forests of other Countries

By D. E. Hutchins, F. R. Met. Soc., Conservator of Forests,
Cape Town.

(*Continued from page 308.*)

TREES FOR THE TRANSVAAL.

With evaporation so active and the rainfall usually insufficient for the best tree growth, the Transvaal is essentially a Conifer country.

Eucalypts on the Transvaal high veld cannot be expected to grow so well as in the middle districts of Natal or the coast lands of Cape Colony, but there seems no reason why the fine coniferous forest of Mexico should not be repeated in the higher central and eastern districts of the Transvaal, and, with the Mexican trees, there may be many useful trees from certain parts of China, such as Yunnan, where the climatic conditions very closely resemble the better watered parts of the Transvaal plateau country. Southern Japan will probably furnish a certain number of trees that can be grown remuneratively in the Eastern forest country of the Transvaal, but the climatic conditions are not quite similar, the Eastern forest country of the Transvaal being cooler in summer and drier in winter and spring. The trees of middle Japan are climatically suited only for test planting in the Transvaal even admitting that altitude compensates latitude. The cold wet winter of the middle districts of Japan, Tokio for instance is entirely wanting in the Transvaal. Thus, *Pinus thunbergii*, the Black pine, *Cryptomeria japonica*—the most generally planted tree of Japan, (Sargent) *Podocarpus nageia*, *Skiadopitys verticilata*, *Abies firma*—the species chiefly called Momi (Sargent) *Cinammomum camphora* the Camphor, and the sweet-flowered *Michelia compressa*, *Celtis sinensis* and perhaps *Zelkova keaki* the pearl of Japanese Timber trees, *Pinus densiflora* and *Tsuga tsuga* the Southern Tsuga may be planted with the expectation of success in the Eastern forest country of the Transvaal.

But, *Cupressus obtusa*, Hinoki—the most valuable of all the Japanese Conifers, *Cupressus pisifera* the Sawàra, the venerable *Ginko biloba*, *Tsuga diversifolia*—the Northern Tsuga, *Larix leptolepis* the Japanese Larch and other trees from mid-Japan should be planted at first only in arboreta or in test plantations on damp wet mountains such as the Volkberg.

The trees of Northern Japan or the trees from the remarkably rich island flora of Yezo have no practical interest for the Transvaal.

It is probable that the slopes of the southern Andes will furnish some suitable trees for the Transvaal. Here we get a summer rainfall and latitudes and altitudes corresponding to the Transvaal, but there does not appear to be much valuable forest here.

The drier Western Himalayas seem likely to supply the Transvaal with two or three good timber trees notably the Deodar and *Pinus longifolia*. But the Western Himalayas have sufficient winter rainfall (and snowfall) to throw an element of doubt on the final success of its trees in the Transvaal. The little planting of Deodar that has been done so far in the Transvaal shews always a good or fair growth.

Australia has no plateau country corresponding to the Transvaal. All Australian trees on the Transvaal High veld are growing there with altitude compensating latitude. It will require half a century to show exactly how far this compensation holds good. The havoc played by the frost of 1895 soon dispelled the idea that all the extra-tropical Australian trees would flourish in the Transvaal. The New England plateau of New South Wales is probably that part of Australia that best reproduces the Transvaal plateau climate but here there is almost enough winter rainfall to entitle it to rank as an all-the-year-round rainfall country, so that the New England plateau trees are only really adapted to the eastern forest country of the Transvaal.

The Yunan and Zechuen provinces of Western China have a plateau climate which seems to resemble the better watered parts of the Transvaal in many respects. This country is however more broken than that of the Transvaal and in its better wooded northern part colder than the Transvaal. It contains, however, much fine forest. It may be said to represent an eastern drier extension of the Himalayan forest flora quite free of winter rains. Travellers speak of pine forest that require days to traverse. This seems to be a country from which the Transvaal Forest Department should endeavour to procure regular supplies of tree seeds. After Mexico it may be the country coming nearest climatically to the Transvaal.

MEXICO.

In all the world, Mexico is the country that affords the closest climatic parallel to the Transvaal. Here elevation, mean temperature, rainfall, latitude, are all the same. There is only the difference between the northern and the southern hemispheres, a climatic difference so subtle that few trees seem to appreciate it.

I may here reproduce the sketch of the Mexican climate and forests given in my Transvaal Forest Report of 1903 with some further notes from Drude's "Geographie Botanique."

Temperate Mexico is represented by a plateau in the same latitude, but of somewhat higher elevation than the Transvaal. The lower portions of the plateau of Mexico have elevations similar to those of the Transvaal, and a heavy rainfall brought by the North-east Trade wind, corresponding to the heavy rainfall brought by the South-east Trade to the eastern side of the Transvaal plateau. It is in the Wood-Bush Range and along the eastern edge of the Transvaal plateau, therefore, that the Mexican trees are likely to shew the finest growth. The higher Mexican elevations can only be reached in temperature and rainfall on certain Transvaal mountain tops. The planting of these will depend naturally on their accessibility. I understand that there are a considerable number of such sites along the eastern Transvaal border. It should be noted that in the same latitude, and for the same altitude, temperatures are two or tree degrees lower in the Transvaal than in Mexico; thus, 5,000 feet in the Transvaal would correspond with 6,000 feet in Mexico.

Mexico gets its rains on the eastern side directly from the North-east Trade wind; on the western side, indirectly, the North-east Trade wind being deflected landwards with a monsoonal effect when the sun is at its zenith. Thus the rain is heavier and lasts longer on the eastern or Atlantic than on the western or Pacific slope; in fact, on the mountains of the eastern side the rains last for nine months, and there is no real dry season, since even in winter, when the dry northerly winds are blowing, this portion of the country is bathed by frequent mists. Here we have the parallel of the Wood-Bush Range in the Transvaal. The forest on the Atlantic slopes of Mexico is dense and characterised by evergreen oaks, of which Liebman distinguishes twenty varieties on Orizaba. Altogether, eighty species of Mexican Oaks have been described, of which nearly the whole are endemic to Mexico. There are more species of Oak in Mexico than in any other country. Oaks occur even on the tropical coast—*Quercus oleoides* is one of these. At an elevation of 2,500 feet Oaks become abundant, small trees or shrubs with stiff leaves (*Q. petiolaris*, *Q. tomentosa*) forming a dense undergrowth and growing associated with Magnolias, Bamboos and ferns. Lianas, as in Cape forests, festoon the trees. At an elevation of 4,700 feet is seen in abundance the curious *Quercus galeottii* with leaves like a birch, and *Q. insignis* with large acorns two inches in diameter. Most of these Oaks furnish inferior hardwoods, only useful as firewood, but the following three are good timber trees:—

Q. skinneri. Seems the best of the Mexican timber Oaks, a leaf-shedder, with durable timber and a large useful acorn.
Q. sideroxlyon. Little inferior to *Q. skinneri.*
Q. reticulata. Timber considered inferior to the other two.

Other Oaks worth planting are:—

Q. salæpensis. Poverty Oak. Prospers on poor soils, yields good crops of acorns and is quick-growing, seems worth trial in fire lines.
Q. castanea. Chestnut Oak. One of the Oaks that bear a sweet acorn.
Q. agrifolia. Grows slowly to a noble shade tree.

With the leaf-shedding Oaks the fall of the leaf is short. Drude averages it at only about a fortnight. It occurs in February. The evergreen Oaks are found at the lower elevations, the leaf-shedding Oaks at the higher elevations.

On the western slope there is none of the dense forest and heavy vegetation characterising the eastern slopes, but, curiously, the temperate forest zone descends here lower than on the eastern side, though the climate is drier and warmer. It is warmer (1) because there is less cloud and rain, (2) because the Trade winds, after passing over the mountains and plateaux, descend to it as warm dry winds. Thus Conifers, which, according to Humboldt, are not seen lower than 5,700 feet on the eastern side, are seen at 8,000 feet on the western side, while on the western side Oaks abound at 2,000 feet.

The average elevation of the great plateau of temperate Mexico is from 6,000 to 8,000 feet. It enjoys an equable climate. there being a difference of only 14 degrees between the warmest and coldest months at Mexico City (7,391 feet elevation, mean temperature 60 degrees). This may be compared with 14·25 degrees, the difference for the Cape Peninsula, and 20 degrees for Johannesburg.

Rainfall.—The rainfall on the Mexican plateau varies according to elevation and aspect. Generally, Northern Mexico is dry, Southern Mexico wet, while the driest part is an inland strip running north of Mexico City. Northern Mexico has a general average of from 20 to 30 inches rainfall. In the dry central strip the rainfall is under 20 inches, while in Southern Mexico it runs up to 60 and 80 inches on the plateau, and higher still on the coast. Mexico City has a rainfall of 26 inches and Oaxaca with its great Cedars (*Taxodium mucronulatum*) has 28 inches, while the Mountain of Orizaba, with its forests of Oak and Pine, has a rainfall of 78 inches.

Wooded kloofs, termed "Barancas," traverse the plateaux, and mountain ranges are seen in every direction The highest and most inaccessible of these are well wooded. Oak and Pine are the chief species, but several fine Cedars are abundant. *Juniperis flaccida, J. occidentalis*, and *J. pachyphloia* abound in the north-east, sometimes forming pure forest, while *J. mexicana* is widespread. *Taxodium mucronulatum* occurs in the southern, better-watered districts.

Of Conifers it is reckoned that there are 20 species. The highest mountain slopes from 6,000 to 12,000 feet are occupied by Conifers. *Pinus leiophylla* is the first pine seen. Above this at 7,600 feet are forests of *Pinus montezumæ*, the branches festooned with lichen. Here the pines begin to replace the Oaks.

On the Peak of Orizaba we have the Mexican Silver fir, *Abies religiosa*, occupying a clearly marked zone between 9,000 and 11,000 feet; mixed with this is *Pinus montezumæ* and above this, at a higher elevation still, *Pinus montezumæ* and *Pinus hartwigii*.

As regards the lower limit of the Mexican Pines, *Abies religiosa* is found near the City of Mexico and *Pinus oocarpa* on the slopes of

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An *Inchlomu* Tree   Banks of Komatie River, Transvaal.

the Jaruloo Volcano at an altitude of only 2,000 feet (Fournier), while *Pinus tercote* occurs at lower elevations still on the lower mountain slopes immediately above the Savanahs.

MOUNTAINOUS FOREST OF NORTHERN MEXICO.

Drude gives the following account of the forest on the mountains of the dry country in Northern Mexico:—

Evergreen Oaks are found on the slopes of the mountains, Cypress in the valleys, Pine at altitudes above 6,000 feeet. These forests are all evergreen. Leaf-shedding trees are of quite secondary importance here. The general character of these forests is extra-tropical. To this region belong the Sierra Madia and the Mountains of Chihuahua and Durango.

After crossing the Tropic of Cancer the forest takes on a more tropical character, but the most important forest species remain the same, that is to say, *Quercus crassifolia, Quercus reticulata, Abies religiosa, Pinus montezumæ.* All the North Mexican Oaks are evergreen. The most important of the Oaks is the Black Oak of Mexico (*Quercus emoryi*). This is remarkable for its abundance and for the wide extent of its habitat, extending from New Mexico, U.S.A., to the central provinces of Mexico. After the Black Oak must be mentioned the White Oak (*Quercus grisea*). After this, *Quercus hypoleuca,* a species which extends to the higher elevations and which has acorns taking two years to mature.

Among the Conifers of this region we find, at lower elevations, *Cupressus guadalupensis* and *Juniperus pachyphlœa,* at higher elevations, *Pinus chihuahuana.* This Pine, which is rather rare in the United States, is the most important pine for building timber in the northern provinces of Mexico. At the higher elevations it is a tall forest tree, the forest being somewhat open and mixed with shrub and grasses. At other times, as on the mountains of Santa Rita, between 4,000 and 6,000 feet elevation, the Chihuahua pine grows in forest mixed with leaf-shedding trees, such as *Juglans rupestris, Fraxinus pistaciæfolia, Platanus whightii* and *Populus fremontii.* (*Geographie botanique.*)

To many people the forests of Mexico are simply known as the home of the Mexican Cedar, *Taxodium mucronatum* (*T. mucronulatum* or *T. distichum* var. *mexicana.*). It forms pure forest at about 5,000 feet elevation and various noble trees are referred to by travellers in enthusiastic terms. The Mexican tree is closely allied to the American *Taxodium distichum,* which is already growing in the Transvaal. If this magnificent tree be not too slow-growing, it is evidently destined to take an important part in the Transvaal forestry of the future. Extends to Southern Mexico as far as Oajaca in latitude 17°, rainfall 28 inches. Botanists differ as to whether the Mexican tree is a separate species or only a variety of the U.S.A. tree. Sargent says that the best European botanists studying the American and Mexican trees as growing side by side in Italian gardens, consider them specifically distinct. He adds that the Mexican tree "differs" in its flowering season which is the autumn, in being evergreen, in its more elongated panicles of staminate flowers and in its more numerous anther-cells often from seven to nine in number, but none of these characters are important enough to differentiate a species. *T. mucronatum* is widely scattered over Eastern and Southern Mexico, that is to say, the wetter parts of Mexico. The largest of the Mexican trees on record is that at Tule, with a mean diameter of thirty feet, a height of 150 feet, and a branch spread of 141 feet. This tree is believed to be 2,000 years old. The celebrated Montezume Cypress, in the gardens of Chepultepec, at Mexico City, is somewhat higher, but of much less diameter. It is over seven centuries old. The timber of the Mexican tree has all the good qualities of the better known Swamp Cypress of the Southern States of the U.S A. This tree has been planted for ornamental purposes to some extent in Southern Mexico.

In the drier country of Northern Mexico *Fraxinus berlandieriana,* an Ash, and *Sambucus mexicana,* the Mexican Elder, are preferred.

Mexico has had a troublous past. Its once fine forests have been largely destroyed and with the forest has gone much of the moisture and fertility of the country. Mexico is near great forest regions in the U.S.A., so that Forestry in Mexico cannot offer the remunerative prospects of Forestry in the Transvaal, where the carriage on coniferous timber is a matter of 6,000 or 8,000 miles.

Trotter, writing in 1903, estimates the forests of Mexico to cover an area of 25 per cent. of the total surface.

JOHANNESBURG RAINFALL NOT ENOUGH FOR DENSE FORESTS OF EUCALYPTS.

It is probably only along the eastern and higher portions of the plateau, such as Johannesburg, (nearly 6,000 ft.), that the rainfall is sufficiently good for trees in masses. At Johannesburg the rainfall seems enough for a dense forest of pines but not enough for a dense forest of Eucalypts. In the fine Saxonwald plantations near Johannesburg it is noticeable nearly everywhere that the cover of the Eucalypts grown in masses is poor while that of the Pines, similarly massed, is good. In the Eucalypt we have a tree notorious for its moisture demands on the soil. The Pines make less moisture demands on the soil than most trees, less in fact than Oaks and other leaf-shedding trees of Europe. The rainfall at Johannesburg, (31 inches,) is somewhat low for a good tree-growth under the climatic conditions, and I think we may fairly assume that the comparative failure of the Eucalypts and the success of the Pines is due to the different demands of these classes of trees on sub-soil moisture. Eucalypts in rows, in scattered plantations, or singly, generally grow splendidly at Johannesburg, as here they have the command of a larger area of sub-soil moisture.

It is noticeable that there is very little sign of natural reproduction amongst the Eucalypts planted in the Saxonwald at Braamfontein, near Johannesburg. At the Cape and in Natal, plantations of the age of the Saxonwald would already be shewing a certain natural reproduction, and with a few species an abundant young re-growth.

J. S. Gamble, F.R.S., has remarked that on the Nilgiri plateau in South India, the effect of planting Eucalypts is to drain swampy valleys and deprive them of their flowing water. The swamps of the early days at Saxonwald have now all disappeared and the level of the water in wells has sunk. It is to the Eucalypts no doubt that this disappearance of water is chiefly due.

On the western side of the Transvaal plateau and on the lower portions of the plateau generally, successful tree-growth will probably be limited to the open class of forest seen in the eastern plateau country of Australia, and in the middle districts of America between the heavily timbered Eastern States and the prairie country of the West.

Frost, which is of little account in the forest districts of the Cape, becomes a serious factor in the Transvaal. A great variety of Eucalypts which flourish in the more equable climate of the coast districts perish in the Transvaal, where in the dry winter there is a very active radiation, a hot sun during the day followed by frosts of great severity at night. Of the Eucalypts hitherto tried in the Transvaal those that have been found best to withstand the frosts are *Eucalyptus viminalis*, *E. coriacea*, *E stuartiana* and *E. rostrata*. The frost of 1895 at Johannesburg destroyed most of the Blue-gums, and played havoc amongst the Black Wattle of all ages. It was noticed at that time that generally all the large leaved more luxuriant growing Eucalypts were killed by the frost. The effect of the frost is naturally intensified by the comparatively long hot days of winter. As shewing the difference between the climate of the Transvaal and that of the Cape coast districts it may be noted that Black Wattle in the Transvaal begins to flower at the end of July, and is in full flower at the end of August, the time when it is usually just coming into flower at the Cape. The Oak in the Transvaal is about two weeks before the Oak in the Cape Colony in coming into leaf.

The indigenous forest in the north-east of the Transvaal lies at an elevation of between 4,000 and 6,000 feet, in a climate protected from the radiation frosts of the interior by constant mists and moisture bought in from the sea. Here, as we have seen, the indigenous forest preserves its evergreen character. Only here and there at rare intervals are leaf-shedding trees to be seen, chiefly Camdeboo — Stinkwood (*Celtis kraussiana*) and Wild Chestnut. (*Calodendron capense*).

TRANSVAAL TREES.

The following list differs from that in my Transvaal (1903) Report in that this list embraces only trees suited for the plateau country down to an elevation of 2,000 ft. A complete list of low-country trees has already been given under No. 11, Natal coast and Semi-tropics.

Since the publication of my Transvaal Report, has appeared Part 12 of Prof. Maiden's *Forest Flora of New South Wales*, in which is given a new classification of the *Callitrisee*. This classification has been adopted in the following list. Notes such as are required to make the classification clear will be found in the Rhodesian list that follows. The *Callitrisee* are not the most important of timber trees, but being hardy against drought and frost and fire they are probably destined to play an important part in afforesting the drier parts of the Transvaal. Though always slow-growing and often too small for sawn timber they are valuable in a treeless country. They have soft cedarlike easily worked timber which is sometimes as beautifully figured as the finest Black Stinkwood. This timber too is often as durable as the Cape Cedar, *Callitris arborea*, and is specially resistant against White-ants. The drawbacks to *Callitris* timber are its small size and brittleness. Like the *Cypress* which they so much resemble, all the *Callitris* trees are ornamentals, particularly *Callitris cupressiformus* with its nodding pendulous top and its bright fresh green foliage.

A list of Trees suited for cultivation on the Transvaal plateau and upper Natal, comprising 387 species.

ABIES DELAVAYI	Yunan Silver Fir	Wet mountain tops only.
,, FIRMA (A. MOMI OF SARGENT)	The Momi Silver Fir	
,, PINDROW (A. WEBBIANA)	Himalayan Silver Fir	
,, RELIGIOSA	Oyamel Silver Fir	
,, SMITHIANA	*see* Picea morinda	
,, VEITCHII	Japanese Silver Fir	
ABIETIA FORTUNEI	Fortune's Fir	
MACROCARPA (PSEUDOTSUGA DOUGLASII)	Douglas Pine	
ACACIA BINERVATA	Binervata Wattle	
,, DEALBATA	Silver Wattle	
,, DECURRENS	Black Wattle	
,, DORATOXYLON	Mulga. Warm N.W. Transvaal only	
,, EXCELSA	Ironwood Wattle. Warmer country only	
,, FALCATA	Falcata Wattle. ,, ,, ,,	
,, FASCICULIFERA	Wattle Warm N W. only	
,, GLAUCESCENS	Rosewood. Warmer eastern country only	
,, HARPOPHYLLA	Brigalow	
,, HOMALOPHYLLA	Homalophylla Wattle (Myall)	
,, IMPLEXA	Implexa Wattle	
,, MACRANTHA	Cuji Pod tree of Mexico	
,, MELANOXYLON	Blackwood	
,, PENDULA	Weeping Myall. N.W. interior	
, PENNINERVIS	Penninervis Wattle	
,, SALIGNA	Saligna Wattle	
,, STENOCARPA	Suak Gum tree of Abyssinia	

ACER CAMPESTRE	The common Maple
„ MACROPHYLLUM	Macrophyllum Maple of N. Mexico
„ PICTUM	Pictum Maple of Persia and Himalayas
„ PSEUDOPLATANUS	Sycamore Maple
„ RUBRUM	Red Maple of Eastern Texas. Swampy ground
„ SACCHARINUM (WANG). Of Hough, of Sargent in Census Report, and of Gamble	
„ BARBATUM (MICH.) Of Sargent in Silva of U.S.A.	
„ SACCHARUM (MARSH) OF SUDWORTH	Sugar Maple
ACROCOMIA MEXICANA	Palm. Mexico to 3,000 ft

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Wild Lemon, *Xymalos Monospora*.

AGATHIS BROWNII (DAMMARA BROWNII)	Brown's Kauri
„ ROBUSTA (DAMMARA ROBUSTA)	Queensland Kauri
ALBIZZIA JULIBRISSIN	Rose Silk Acacia. Ornamental
„ LEBBEK	Lebbek Acacia Avenue tree for warm dry country
ALIBERTIA EDULIS	Marmeladinha fruit tree. East only
ALNUS ACUMINATA	Alder. Mexico near streams
ANGOPHORA LANCEOLATA	Angophora
„ SUBVELUTINA	Angophora
APODYTES DIMIDIATA	White Pear. Eastern forest country only
ARAUCARIA BIDWILLI	Bunya-bunya
„ BRASILIANA	Araucaria. Eastern forest country
„ COOKII (A. COLUMNARIS, HOOK).	Cook's Araucaria do, do

ARAUCARIA CUNNINGHAMII	Moreton Bay Pine
,, EXCELSA	Norfolk Island Pine. Warmer Eastern District
,, MONTANA	Mountain Araucaria Warmer Eastern District
,, RULEI	Rule's Araucaria. Warmer Eastern District
ATALANTIA GLAUCA	Wild Lemon. Warm N.W. only
BACTRIS GASIPAES	The Peach Palm
BAMBUSA ARUNDINACEA	Thorny Bamboo
,, BALCOOA	Cape Bamboo
BAUHINIA CARRONII	Queensland Ebony Warmer western country
HOOKERI	Queensland Ebony. Warmer Western country

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White Pear, *Apodytes dimidiata*.

BELIS JACULIFOLIA (CUNNINGHAMIA SINENSIS)	Belis of Yunan
BETULA ALBA	Birch (common)
,, ALNOIDES	Himalayan Birch. Eastern forest country]
BROUSSONETIA PAPYRIFERA	Paper tree Lower districts with irrigation
BURSERA ELEMIFERA	Copal tree. Mexico to 5,000 feet
CALLISTEMON LANCEOLATUS	Red Bottle Brush
CALLITRIS CALCARATA	Calcarata Callitris (Black pine of Australia
,, CUPRESSIFORMIS	From N S. Wales. Ornamental. Eastern forest country
,, COLUMELLARIS	Column Callitris Eastern forest country
,, MACLEAYANA	Stringy-bark Cypress. Eastern forest country

·CALLITRIS ROBUSTA	Murray Cypress. White pine of Australia, the best species for timber and the most wide-spread	
,, VERRUCOSA	Warted Callitris. Bushy, very dry country only	
,, WHYTEI	M'lanji Cedar. Eastern forest country	
·CALADENDRON CAPENSE	Cape Chestnut. Eastern forest country	
CASIMIROA EDULIS	Mexican Apple	
CASTANEA VESCA	Sweet Chestnut Tree	
,, VAR. JAPONICA	Japanese Chestnut	
CASUARINA CUNNINGHAMIANA	Beefwood	
,, DECAISNEANA	Beefwood	
,, GLAUCA	Desert Beefwood	
CATALPA SPECIOSA	Catalpa	
CEDRELA ANGUSTIFOLIA	Cedar	
BOGOTENSIS	Cedar	
MONTANA	Cedar	
SERRATA	Cedar	
SINENSIS	Cedar of China	
TOONA	Toon of India, Red Cedar of Australia	
,, VELLOZIANA	Cedar. Forest country only	
·CEDRUS DEODARA	Deodar	
CEPHALANTHUS OCCIDENTALIS		
CEPHALOTAXUS DRUPACEA	Cow's Tail Pine	
CERATONIA SILIQUA	Carob	
CEROXYLON ANDICOLA	Wax Palm	
CHAMAEDORA ELATIOR	Palm	
CHUSQUEA CULEOU	Bamboo	
CINNAMOMUM CAMPHORA	The common Camphor Tree	
COCOS AUSTRALIS	Palm	
,, FLEXUOSA	Palm	
,, PLUMOSA	Palm	
,, YATAY	Palm	
COPERNICIA CERIFERA	Palm	
·CORYLUS AVELLANA	Cob-nut Tree	
,, COLURNA	Cob-nut Tree	
CRATAEGUS MEXICANA	Mexican Hawthorn	
·CRYPTOCARYA GLAUCESCENS	Cryptocarya	Lower elevations
,, OBOVATA	Cryptocarya	
,, TRIPLINERVIS	Cryptocarya	
CRYPTOMERIA JAPONICA	Japanese Cedar	
·CUPRESSUS BENTHAMI*	Bentham's Cypress. Higher elevations	
,, FUNEBRIS	Funebris Cypress	
,, GLAUCA	Cedar of Goa	
GAUDALUPENSIS	Guadalupe Cypress	
LINDLEYI	Lindley's Cypress	
LUSITANICA	Portuguese Cypress of Cedar of Goa	
PISIFERA	Pisifera Cypress	
OBTUSA	Obtusa Cypress	
,, SEMPERVIRENS	Common Cypress	
,, THURIFERA	White Cedar	
,, TORULOSA	Torulosa Cypress	
·CURTESIA FAGINEA	Assegaiwood. Forest country only	
CYPHOMANDRA BETACEA	Tree Tomato. Lower elevations.	
DALBERGIA MISCOLOBIUM	Miscolobium Jacaranda	
,, NIGRA	Jacarandawood Tree	Eastern Forest country
,, SISSOO	Sisu	
DAPHANDRA MICRANTHA	Australian Yellow-wood	
DENDROCALAMIS STRICTUS	Common Bamboo of India	
DIOSPYROS KAKI	Persimmon	
,, TEXANA	Mexican Persimmon	
DODONEA VISCOSA	• Drought resistant. Shrubby	
DRACAENA DRACO	Dragonblood Tree	
DYSOXYLON FRASERIANUM	Pencil Cedar	Eastern forest country
,, MUELLERI	Pencil Cedar	
ECHINOCARPUS AUSTRALIS	Maiden's Blush	

ERYTHRINA ZEYHERI	Kaffir Coral Tree
EUCALYPTUS ACMENOIDES	Acmenoides Gum
,, AMYGDALINA (var. LINEARIS)	Narrow leaved Amygdalina Gum. Ornamental
,, BEHRIANA	Behriana Gum. Dry country
,, BICOLOR (E. LARGIFLORENS OF MUELLER)	Bicolor Box
,, BOTRYOIDES	Botryoides Gum. Quick-growing and hardy
,, CITRIODORA	Scented Gum
,, CONICA	Conica Gum. Dry country
,, CORIACEA (E. PAUCIFLORA OF MUELLER)	Leather Gum
,, CORYMBOSA	Bloodwood
,, CORYNOCALYX	Sugar Gum. Dry country
,, CREBA	Iron-bark
,, DEALBATA	Stanthorpe's Messmate. Lower elevations, stands drought
,, GLOBULUS	Blue-gum
,, GRACILIS	Gracilis Gum. Western Transvaal
,, HEMIPHLOIA	Grey Box. Western Transvaal
,, LONGIFOLIA	Longifolia Gum
,, MACULATA	Maculata Gum
,, MELANOPHLOIA	Silver-leaved Iron-bark
,, MELLIODORA	Yellow-box. Dry Country
,, MICROCORYS	Tallow-wood. Wet lower elevation
,, MICROTHECA	Microtheca Gum
,, ODORATA	Odorata Gum
,, PANICULATA	Paniculata Iron-bark
,, POLYANTHEMUS	Den
,, POPULIFOLIA	Populifolia Gum
,, RESINIFERA	Mahogany Gum or Forest Mahogany. Lower damp country
,, ROBUSTA	Robusta Gum
,, ROSTRATA	Rostrata Red Gum
,, SALIGNA	Saligna Gum (Blue Gum in New South Wales)
,, SALMONOPHLOIA	Salmon-bark Gum Dry country
,, SIDEROPHLOIA	Broad leaved Iron-bark
,, SIDEROXYLON	Sideroxylon Iron-bark
,, TERETICORNIS	Tereticornis Gum
,, TERMINALIS	Blood Wood. Dry country
,, VIMINALIS	Viminalis Gum. Frost resistant
EUGENIA CORDATA	Waterboom. Eastern forest country
,, EUCALYPTOIDES	Mini. Lower elevation only
,, NHANICA	Nhanica Tree. Eastern forest country
,, PYRIFORMIS	Uvahlho do Campo. Eastern forest country
FICUS CUNNINGHAMI	Cunningham's Fig
,, SPECIOSA	Native Fig
,, MACROPHYLLA	Moreton Bay Fig Tree
,, WATKINSIANA	Watkin's Fig
FLINDERSIA AUSTRALIS	Crow's Ash. Lower damp country.
,, BENNETTIANA	New South Wales Teak } Lower damp elevation.
,, BOURJOTIANA	Flindersia
,, OXYLEYANA	Queensland Yellow-wood
FRAXINUS CHINENSIS	The Chinese Wax Ash
EXCELSIOR	The Common Ash } Cold, wet country on good soil
FLORIBUNDA	Floribunda Ash
TEXENSIS	Texan Ash
VELUTINA (Torr.)	Velutina Ash
BERLANDIERIANA	(A. de C.) (Sudworth). Green Ash. 'Commonly planted and unsurpassed as a shade tree in Northern Mexico
FUSANUS ACUMINATUS	Kwondong
GINKGO BILOBA	Maidenhair Tree. Sensitive to drought
GLEDITSCHIA TRIACANTHOS	Honey Locust
GLYPTOSTROBUS HETEROPHYLLUS (TAXODIUM SINENSIS)	Chinese Water Pine

GMELINA LEICHARDTII	Queensland Beech	
GREVILLEA ROBUSTA	Silky Oak	
,, STRIATA	Beefwood	Lower elevation in dry country
HAGENIA ABYSSINICA	Hagenia	
HAKEA SALIGNA	Saligna Hakea	
HARPULLIA HILLII	Hill's Harpullia	Lower elevation in damp country
,, PENDULA	Tulip-wood	
HELICIA PRAEALTA	Long leaved Nut Tree	
ILEX AQUIFOLIUM	Holly	
,, PARAGUENSIS	The Mate Tea Tree	Lower well watered country
JACARANDA MIMOSÆFOLIA	Jacaranda	Lower well watered country
JUGLANS NIGRA	Black Walnut	
,, REGIA	Common Walnut Tree	
,, SIEBOLDIANA	Siebold's Walnut of Japan	
JUNIPERUS BERMUDIANA	Pencil Cedar	Lower elevation
CEDRUS	Canary Island Cedar	
CHINENSIS	Chinese Juniper	
MACROPODA (J. EXCELSA OF BRANDIS)	Himalayan Pencil Cedar	
MEXICANA	Mexican Juniper	
MONOSPERMA	Monosperma Juniper	
OCCIDENTALIS	Occidentalis Juniper	
PACHYPHLOIA	Thick bark Juniper	
PROCERA	Procera Cedar	
SPHAERICA	Sphærica Juniper	Northern Transvaal
TAXIFOLIA	Yew-leaved Juniper	
UTAHENSIS	Utah Juniper	
VIRGINIANA var SCOPULORUM	Ordinary Pencil Cedar	
LAGESTRŒMIA INDICA	Pride of Pretoria	
LARIX LEPTOLEPIS	Japanese Larch	Wet country
LIBOCEDRUS DECURRENS	Incense Cedar	
,, MACROLEPIS	Chinese Cedar	
LIQUIDAMBAR STYRACIFLUA	Liquidambar Tree	
LIRIODENDRON TULIPERIFERA	The Tulip Tree	Wetter, colder country
LOXOPTERYGIUM LORENTZII	Quebracho Colorado	Damp lower elevation (low country)
LYSICARPUS TERNIFOLIUS	Tom Russell's Mahogany	Do do
MACADAMIA TERNIFOLIA	The Nut Tree	Damp lower elevation
MACHAERIUM ALLEMAI	Machærium	Eastern forest country
,, INCORRUPTIBILE	,,	
,, LEGALE	,,	
MACLURA AURANTIACA	Osage Orange	
MANGIFERA INDICA	The Mango	Lower damp localities
MELALEUCA LEUCADENDRON	The Cajaput Tree	Slow-growing Try on swampy ground
,, LINARIFOLIA	Tea Tree	
,, STYPHELIOIDES	,,	
MELIA AZEDARACH	Syringa	
,, COMPOSITA	Australian Syringa or White Cedar	
, INDICA	Neem	
MESPILUS GERMANICA	Medlar	Eastern forest country
MICHELIA CHAMPACA	Champaka	Lower damper elevation
,, COMPRESSA	Japanese michelia	
MORUS ALBA	White or common silk Mulberry	Eastern forest country
CELTIDIFOLIA	Mexican Mulberry	
INDICA	Indian Silk-worm Mulberry	
MICROPHYLLA	Microphylla Mulberry	
NIGRA	Black or common fruit Mulberry	
RUBRA	Red Mulberry	
SERRATA	Serrata Mulberry	
NEGUNDO ACEROIDES	Box Elder	
OCOTEA BULLATA	Stinkwood	Eastern forest country
ORITES EXCELSA	Silky Oak	
OWENIA VENOSA	Tulip Wood	
PARKINSONIA ACULEATA	Jerusalem Thorn	
PAULOWNIA IMPERIALIS	Paulownia	

PERSEA NANMU	Chinese Coffin Tree. Lower damp country	
,, TENERIFFAE	Persea. Lower damp country	
PHŒNIX DACTYLIFERA	Date Palm. Dry warm country and irrigation	
PHYLLOSTACHYS BAMBUSOIDES	Bamboo	Lower elevation, in damp country
,, MITIS	Bamboo	
,, PUBERULA	Bamboo	
PICEA ALCOCKIANA	Spruce Japan and Mongolia	Spruces. Damp wet mountain ground only
,, AJANENSIS	Northern Japanese Spruce	
,, BRACHYTILA	Yunan	
,, LIKIANGENSIS	Yunan	
,, MORINDA	Himalayan Spruce	
,, OBOVATA (var. SCHRENKIANA)	Yunan	
,, POLITA	Tiger-tailed Spruce. Small ornamental	
PINUS ARMANDI (CEMBRA)	Yunan	
,, AUSTRALIS	Long-leaf Pitch Pine. A first rate tree for the Transvaal	
,, AYACAHUITE	White Pine of Mexico. High elevation only	
,, BUNGEANA	Bunge's Pine. A first-class pine, promising well	
,, CANARIENSIS	Canary Pine	
,, COULTERI	Big cone Pine	
,, CUBENSIS (P. CARIBAEA)	Slash Pine of Florida Mountains of Central America. Warm Eastern forest country	
,, DENSIFLORA	Densiflora Pine, Yunan, Japan. Promises well in the Transvaal	
,, DOUGLASII (var. MACROCARPA)	(See Abietia macrocarpa)	
,, EDULIS	Edulis pine. Eatable nut	
,, EXCELSA	Excelsa pine. Of poor promise	
,, FILIFOLIA	Filifolia pine. Mountains of Guatamala; heavy rainfall	
,, GERARDIANA	Himalayan Nut pine	
,, HALEPENSIS	Jerusalem or Aleppo pine Prefers winter rains	
,, HARTWIGII	Hartwig's pine. High mountain tops only	
,, INSIGNIS	Insignis pine. Not recommended	
,, KHASYA	Khasya pine Eastern forest country	
,, KORAIENSIS	Korean pine. For trial generally	
,, LAMBERTIANA	Sugar or Giant pine	
,, LARICIO	Laricio pine. Of little promise	
,, LONGIFOLIA	Longifolia pine. Warm Eastern forest country	
,, MANDSHURICA	Manchurian pine. Promises well	
,, MASSONIANA	Massoniana pine. Promises well	
,, MITIS (P. ECHINATA)	Short leaved Pitch pine. Not in dry country	
,, MONOPHYLLA	Stone or Nut pine	
,, MONTEZUMÆ	Montezume's pine. A first-rate pine for the Transvaal	
,, OOCARPA	Oocarpa pine. High mountains only	
,, PALUSTRIS	(See P. Australis)	
,, PARVIFLORA	Parviflora pine. Trial planting only	
,, PATULA	Patula pine. Mexico, above 6,000 feet	
,, PINASTER	Cluster pine	
, PINCEANA	Pinceana pine. Mexico, above 9,000 feet	
, PONDEROSA	Yellow pine. Worthy of extended trial. Mexican or Texan seed to be used	
,, PSEUDOSTROBUS	Mexico. Mountains only in the Transvaal	
,, STROBUS	White or Weymouth pine. Of little promise	
,, SYLVESTRIS	Scotch pine. Damp mountain ground only	
,, TAEDA	Loblolly pine. Of good promise. Texan seed to be used	
,, TEOCOTE	Torch pine. Mexico, above 5,000 feet. First-rate timber	

Pinus TERNIFOLIA	Ternifolia pine. Mexico, above 5,000 feet. A noble pine	
,, THUNBERGII	Thunberg's pine. Plant anywhere in the Eastern country	
,, YUNANENSIS	Yunan allied to P massoniana	
Piptadenia CEBIL	Argentine Tan and Timber	
Pircunia DIOICA	Belhambra	
Pistacia MEXICANA	Mexican Pistacia	
Pittosporum PHILLYROIDES	Pittosporum. Australia, inland	
,, UNDULATUM	Pittosporum Very ornamental, warmer districts	
Platanus MEXICANA	Mexican Plane	Splendid shade trees, plant near water
,, OCCIDENTALIS	American Plane	
,, ORIENTALIS	Plane tree	
,, WRIGHTII	Wright's Plane, Mexico	
Podocarpus ARGOTAENIA	S China Mountains	Yellow woods; moist climates only
,, CHINENSIS	Chinese Yellow-wood Yunan, &c.	
,, ELONGATA	Outeniqua Yellow-wood	
,, THUNBERGII	Upright Yellow-wood	
,, THUNBERGII (var. FALCATA)	Falcata Yellow-wood	
Populus ALBA	White Poplar Naturalized in the Transvaal	Poplars in wet ground on good soil
,, BALSAMIFERA	Balsam Poplar Drier inner Himalayan	
,, EUPHRATICA	Euphrates Poplar	
,, FREMONTII	Fremont's Poplar U S A, Western	
,, NIGRA	Black Poplar	
Prosopis ALBA	Algaroba blanca	
,, DULCIS	Mesquit	Mesquit trees with sweet pods. Driest climates
,, HORRIDA	Algaroba	
,, JULIFLORA	Mesquit Texas	
,, PUBESCENS	Tornillo Mexico	
,, SPICIGERA	Jhand India and Persia	
Prunus AMYGDALUS	Almond tree	
,, CAPULI	Capulinos tree. Mexico	
Pterocarya FRAXINIFOLIA	Ash leaved Walnut. Asia	
Pteroxylon UTILE	Sneezewood. Lower damper districts	
Quercus AGRIFOLIA	Oak. Mexico Slow-growing evergreen shade tree	These Oaks afford useful timber, most of them large crops of acorns and will be particularly useful to plant as fire breaks in the pine forests.
,, BALLOTA	Sweet Acorn Oak Algeria A Variety of Ilex	
,, CASTANEA	Chestnut Oak Sweet Acorns Mexico	
,, COCCINEA	Black Oak U S A grows well, Johannesburg	
,, ILEX	Ilex or Holm Oak. Shade tree Trial planting only	
,, MACROLEPIS	Valonia Oak Test planting only	
,, MAGNOLIFOLIA	Silkworm Oak Mexico	
,, MICHAUXII	Cow Oak. Eastern forest country	
,, MIRBECKII	Zeen Oak The Algerian form of the common oak	
,, OBTUSILOBA	Post Oak. Texas	
,, RECTICULATA	Recticulata Oak Mexico	
,, ROBUR (var. PEDUNCULATA)	Common Oak	
,, ,, (var. SESSILIFLORA)	Seems preferable	
,, SEMECARPIFOLIA	The Karshu Oak Wet mountains	
,, SIDEROXYLON	Ironwood Oak Mexico	
,, SKINNERI	Cozahual. Perhaps the best of the Mexican Oaks	
,, SUBER	Cork Oak Trial planting only	
,, XALOEPENSIS	Poverty Oak Mexico to 5,000 feet. Quick growing	

ROBINIA PSEUDACACIA	Robinia	
SABAL PALMETTO	Palmetto Palm	Lower damp elevations
SALIX ALBA	White Willow	
AMYGDALINA	Almond Willow	A good basket willow
BABYLONICA	Weeping Willow	
CAPREA	The Sallow	The best basket willows yet grown in South Africa
CINERIA	Sallow	
DAVIESII	Davies Willow	Persia. Test planting
HUMBOLDTIANA	Humboldt's Willow.	South America, widespread
,, PURPUREA	Bitter Willow	North Africa and widespread
,, RUBRA	Rubra Willow	A favourite basket willow in North Africa
SAMBUCUS MEXICANA	Mexican Elder	Commonly planted in Mexico for shade and its fruit
, VIMINALIS	Osier Willow	The favourite basket willow in Europe
SCHINUS MOLLE	Pepper Tree	
SCLEROCARYA CAFFRA	Marula	Abundant in the bush country of the Transvaal
SKIADOPITYS VERTICILLATA	Skiadopitys	Eastern forest country only
SEQUOIA SEMPERVIRENS	Redwood	, ,, ,,
SHOREA ROBUSTA	Sal	Low elevations only
STENOCARPUS SINUOSUS	Tulip tree	Low elevations only
STERCULIA ACERIFOLIA	Flame Tree of Eastern Australia	
, DIVERSIFOLIA	Currajong	A valuable cattle fodder
, RUPESTRIS	Bottle Tree	,, ,,
SYNCARPIA LAURIFOLIA	Turpentine Tree	The best marine pile
TARRIETIA ACTINOPHYLLA	Stave Wood	Lower damp country only
TAXODIUM DISTICHUM	Bald Cypress	In swamps
,, MUCRONATUM	Montezume Cypress	Damp country only
TELOPEA SPECIOSISSIMA	Waratah	Splendid flowers fails in dry country
TERMINALIA CHEBULA	Black Myrobolan Tree	Persia Yields the tan nut
TORREYA NUCIFERA (TUMION MUCIFERA)	Japanese Torreya	Trial planting
TRISTANIA CONFERTA	Brush Box	A fine avenue tree with fair timber
TSUGA ARARAGI (TSUGA SIEBOLDI)	Araragi Spruce	Mountains of South Japan
ULMIS CRASSIFOLIA	Cedar Elm	Texas Handsome tree of the dry country
,, MEXICANA	Mexican Elm	Best Elm for the Transvaal
UNGNADIA SPECIOSA	Spanish Buck eye	Mexico
ZELKOVA KEAKI	Keaki of Japan	Eastern forest country only
ARGENTINE CEDAR	Cedrela op	Eastern forest country only The timber of this tree resembles the Red Cedar of Australia
LAPACHO URUNDAY VIRARI		Choice Argentine timbers botanical names not known

NATURAL ENEMIES OF THE FRUIT FLY.

Report on Investigations in Brazil.

By Chas. P. Lounsbury, Government Entomologist.

(*Continued from page 319.*)

Conditions at Sao Paulo.

Sao Paulo, the capital of the state of the same name, is a prosperous and thoroughly modern city of nearly 300,000 people; it lies at an altitude of about 2,500 feet, thirty-five miles from the coast, in latitude 24° South. The average annual rainfall is sixty inches, about three-fourths of which occurs in the summer half of the year, October to May. Slight frosts in winter are often recorded. Very little fruit is grown for sale and that little chiefly in village gardens. However, peach and orange trees are extremely common, few dooryards away from the heart of the city not having one or more of either or both. The loquat, guava, and fig are also common, and the quince, very common. Some Japanese plums have recently been planted, as have also persimmons. Apples and pears are scarce, the climate not suiting them, it is said. The first place I visited was Campinas where is situated the Government Agricultural experiment station, the "Instituto Agronomico," the only institution of its kind, I believe, in the whole of Brazil. Campinas is about fifty miles inland from Sao Paulo and has the same climatic conditions. I arrived there February 15th and at once sought Mr. Adolph Hempel, the station entomologist and plant pathologist, and from him obtained much assistance and information. He was unaware of Mr. Compere's visit to Brazil during the previous year until I told him. Owing to fruit growing having no importance as an industry, he had not specially investigated fruit flies. But he had reared *Trypeta biseriata* from galls on a Vernonia, *Anastrepha fratercula* from loquats, *Ceratitis capitata* from peaches, oranges and loquats, and *Lonchaea glaberima* from a fruit called Maracuja, a kind of *Passiflora*; the determinations of these species were made by Mr. Coquillett. He had not observed any parasites, nor knew he anything of the Staphylinid beetle. Peaches, he said, were almost all infested by maggots every season and throughout the season and many fruits were destroyed long before the normal time of ripening; oranges were little infested when picked early but when allowed to hang into August certainly over half became infested; limes suffered about as severely as oranges; quinces suffered a little, perhaps one in eight or ten becoming maggotty; loquats were often infested but he could not say to what extent; pitangas and guavas were very commonly infested; maracujas were all infested in some gardens; and mangoes during some seasons were infested to a slight extent.

There was no difficulty in finding maggotty fruit in the Campinas market. Guavas, areça mirims, and the few peaches still to be found, were more or less unsound. Visits to the gardens of a few large coffee plantations in the country roundabout also confirmed the prevalence of fruit fly mischief. Sound peaches were not expected, I was told. The season for peaches was passed, and the few found were all very inferior seedlings, small and woody, yet over half were visibly affected. In one large garden over a score of guava trees were found heavy with fruit. The ground beneath was strewn with fruits nearly every one of which contained maggots, and considerably over half of a number of soft ones plucked from the trees were found to be affected. Areça mirims and another kind of *Psidium* in the same garden were infested to an equally great extent, and a number of *A. fratercula* and another species of fruit-fly were seen in the trees. About one-seventh of the maracuja fruits on a large arbour about thirty yards in length were maggotty as was indicated by their shrivelled condition; and the ground beneath the arbour was strewn with fallen 'buds containing maggots in the ovaries. The gardener, on being asked, said that every year practically all the peaches permitted to ripen on the trees became infested, and that he had occasionally seen maggots in mangoes. Quinces, he said, escaped attack, but I easily found the pest in one or two fruits on nearly every one of his numerous trees.

Mr. Hempel kindly accompanied me to Sao Paulo and introduced me to Dr. H. von. Ihring, Director of the Museum, and others. Dr. von Ihring, at once became greatly interested, and gave me two or three days of his time, and permitted his son, Mr. F. von Ihring, Curator of the Museum, to accompany me to some place at a distance. The most important place I visited was the gardens of Dr. Luis P. Barretto at Pirituba. Here there were a few peaches still on the trees, but all except a single one out of at least a hundred examined, contained maggots. Dr. Barretto was absent, but his son, who did the honours of the day, said that few sound ripe peaches were obtained except in the case of two varieties which appeared to enjoy some degree of immunity from being very pilose. We could find six fruits only of one of these varieties and three of the other, but all nine although hard proved to be maggotty under careful examination. The Japanese plums grown at this place are said to get infested. Three specimens of *C. capitata*, one of *A. fratercula* and two of a parasite were seen in the trees. To make certain that the conditions were not dissimilar at some distance from the city, a day was spent at Mogy das Cruces, two or three hours' journey by train to the eastward. Here a number of gardens in and about the town were visited, but in all, the same story was told; scarcely a sound peach, and "bichos" in most of the guavas as well. Questioned as regards his loquats, one old gardener said a great many of those that matured in September and October were infested, but few of those of a secondary crop that ripened in June. Maggots were found in guavas, quinces, maracujas, and *Anona microcarpa*; and *C. capitata* adults were seen feeding and basking on ripening figs, and a number of living puparia were scraped out of the soil beneath the dried remains of fallen peaches. From later enquiries, I learned that the pest was well known, long distances inland. For instance, a former general manager of the great Santos Dumont coffee estates, which are about three hundred miles away, told me that all the peaches grown in the gardens about that place became infested. He described the maggots as similar to larvæ he had often seen in mangoes when he lived in India.

The fruit market at Sao Paulo is one of the best I have ever visited; but at stand after stand not a single locally grown fruit was exhibited. The apples were from North America, and the pears, peaches, and plums from Argentina, and these fruits were all free of maggots. On one stand a few lòcally grown pears were discovered and the first of these examined contained the pest.

Contrary to the inference one might draw from Mr. Compere's report that *C. capitata* is native to Brazil, my enquiries have disclosed some indication that it is a more recently introduced pest there, at least about Sao Paulo, than in South Africa. There is no doubt, from the observations of Dr. von Ihring, Mr. Hempel and myself, that it is the principal species concerned in the infestation of peaches, and I heard, from many parties, statements to the effect that up to about a generation ago the peaches were nearly all good. Mr. Hempel was the first to mention the newness of the pest to me. He has lived only eight years in Brazil, but said that in conversation with parties whom he had met about the country, he was often told that maggots ("bichos" is the actual word used) were unknown in peaches up to about fifteen years ago. He himself thought that the wholesale destruction of small birds might have made the difference. Dr. von Ihring next mentioned the matter, but he too largely from hearsay, yet he was sure that many good peaches were obtained locally when he came twelve years ago. Dr. Alberto Löfgren, the chief of the "Horto Botanico," a government garden, said he was certain that all or most of the peaches about Campinas were good when he came to the country twenty-five years ago. The son of Dr. Barretto of Piritubà said that eighteen years ago his family had a large garden with many peach trees in it about three hours' journey from Sao Paulo and that no maggots in the peaches were observed in those days at that place. A gardener at his present estate said that the peaches there had been infested as long as he could remember, about twenty years, but that older men said that in boyhood the peaches were good.

It was not very generally known about Sao Paulo that oranges were subject to the pest; but Dr. von. Ihring and Mr. Hempel had observed the fact for several years, and Dr. von Ihring had called attention to it by an article entitled "Laranjas bichadas" (Insects of the orange) published in the "Revista Agricola" for May 15th, 1901. The determination of the insect is given as *C. Capitata*; and it is mentioned that the allied insect, *A. fratercula*, is very common in the guava. The names were obtained from Dr. L. O. Howard, the Entomologist of the United States Department of Agriculture. Mr.

Compere learned of the correspondence on the subject when visiting Washington; and, I understand, got the impression that the species must be rare in Brazil from a request which Dr. von Ihring made that the specimens of *C. capitata* he transmitted be returned to him. That simple request, made merely through a desire to minimise the chances of a mistake in attaching labels, is believed to have decided Mr. Compere to visit Brazil.

The fruit fly puparia I obtained about Sao Paulo were nearly all turned over to Mr. Fuller at Bahia and taken by him to Natal along with those reared at Bahia. Those from a small lot of peaches bought at Campinas on February 15th were retained. They yielded twenty-two fruit-flies, all *C. capitata,* but not a single parasite; the emergences occurred March 1st to 4th. One puparium was obtained from a pear bought in the Sao Paulo market; it yielded a specimen of *A. fratercula.* Some other puparia from fruits gathered February 15th to 18th were left with Mr. Hempel. On March he wrote that there had emerged: "From ovaries of *Passiflora,* seven *L. glaberima,* and four *A. fratercula*; from quince, three *A. fratercula* and one parasite; from mixed lot, some *L. glaberima,* many *A. fratercula* and two parasites." The parasites were Braconids and, with little doubt, the *Opiellus trimaculatus* reared at Bahia.

CONDITIONS AT RIO DE JANEIRO.

Rio de Janeiro is situated on the coast in latitude 23° S. It gets about forty-five inches of rain, about two-thirds of which falls between October and March. The mean temperature is given as 74° or about 12 higher than in Cape Town; even in August the mean is above 70°. With so great a heat and with so good a rainfall distributed over the whole year, it is not surprising that most temperate climate fruits fail to thrive. The peach does best, and in the higher parts of the town is to be found in many gardens. The fruit produced, however, is said to be inferior, and most of it is fit only for cooking irrespective of maggots. Oranges, largely the Selecta variety, are grown in the vicinity, guavas grow both wild and cultivated, and in general the same fruits are to be found as about Bahia.

A visit to the market was paid on February 13th when on my way by steamer to Santos *en route* for Campinas. Then quantities of peaches said to have been grown in a mountainous part of the neighbouring state of Minas Geraes were on sale, and many of these were maggotty. A second visit was paid on my return March 1st, but by then only sound peaches from southern ports were found. Finally I spent March 22nd to the 29th in and about the city. During this time the only infested fruits I found in the market were guavas and areça mirims. Of the latter I bought a quantity, March 28th and by count after they had decayed found twenty-five per cent. of the fruits infested; many of these had been picked very green.

Rain fell nearly every day and nearly all of every day the entire week I spent about Rio, so there was little opportunity for field investigations. Moreover the peaches were long past, the citrous fruits still very green, and there were very few ripening guavas. Through the British Consul-General I obtained several introductions and thus learned that maggots in fruits were very common. The American Consul-General resided at Petropolis in the mountains near by; and he said at once that peach trees were plentiful in that vicinity but that all the fruit fell prematurely and that on being opened maggots were disclosed At the National Museum, only two species of *Trypetidæ* were represented in the collections, and these were unknown to me. Senhor Alipio de Miranda Ribeiro of the Museum said that maggots were not at all uncommon in many fruits, but that no one had had occasion to study them. He later recalled having reared out some flies three years ago from "abio" fruits collected locally and succeeded in finding the long forgotten material. It consisted of six specimens representing three species of fruit-flies and a single specimen af the Braconid parasite obtained at Bahia.

Petropolis was visited and the statement made by the American Consul confirmed. This city is really a residential suburb of the federal capital. It is only two hours' journey distant but higher by over two thousand feet. Peach trees are very abundant in its numerous gardens. I enquired respecting the pest at several residences, and at the principal fruit shop, and in each place received information that peaches practically all became infested. The shop man said he never bought any of the local peaches for this reason. The maggot pest was also well known in the guavas and pitangas and I found it in most of the few ripe specimens of these fruits that I came across and also in the only quince, Several specimens of A. *fraterculu* and a single one of the common parasite were seen in guava trees, and though I was unable to detect any *C. capitata* adults I believe that it is this species that infests the peaches. Some good peaches are said to come from Rio Grande de Sul, the southernmost state of Brazil. Dr. von Ihring resided in that state fifteen years ago and said that he had no recollection of maggots ever infesting the peaches. A Petropolis gentleman, however, told me that at the present time a large proportion of the fruits became infested.

CONDITIONS AT BUENOS AYRES AND MONTEVIDEO.

Buenos Ayres, by far the largest city in the southern hemisphere, lies in the same latitude as Cape Town and experiences almost the same mean temperature. The average rainfall is thirty-six inches, which is ten inches greater than that of Cape Town or Stellenbosch. There is no true rainy season as at Cape Town, the average fall for July, the driest month, being two and one-eighth inches, and that for March, the wettest month, only four and one-quarter; and the fall for April to October, the drier half of the year, being four-fifths that of October to April. The soil conditions, too, are utterly different to those at the Cape. The country for hundreds of miles inland is an almost level plain, the soil of which is deep and fertile. Citrous trees grow in many gardens about the city and its vicinity, but few commercial orchards of these are seen. Indeed though the various fruits familiar in the South-Western districts of the Cape are represented in the gardens, the only one very extenstively grown is the peach. Peach trees are seen everywhere and in enormous numbers; and locally raised peaches are said to be in the market from November until late in April.

The inclusion of Buenos Ayres in my itinerary was not intended when I left Cape Town, but I was led to visit the place by the reports I heard, aboard steamers by which I travelled, to the effect that peaches in northern parts of the country were almost invariably maggotty when ripe and that the trouble was experienced, but only to a slight extent, about Buenos Ayres. Dr. Löfgren of Sao Paulo, who had visited Argentina a year before to study the horticultural conditions, confirmed these stories in so far as they concerned the vicinity of the city.

My stay in the city was from April 2nd to the 14th. The British Consul, Mr. A. Carnegie Ross, kindly introduced me at the Federal Department of Agriculture. Here I was met with great kindness from various officers, but to my surprise I failed to learn anything in regard to the fruit fly pest. Dr. Lahills, the chief of the Zoological Division and two of his technical officers, whom I first met, appeared to have never before heard of fruit flies, but it should be mentioned that the only one of the three who was specially interested in insects was new to the country; similarly, however, the Vegetable Pathologist and other officers of the Department were igorant of any maggot fruit pest, and absolutely nothing was known on the subject by the Director of the National Museum and his entomologist, or by the Director of the magnificent La Plata Museum and his entomologist. No specimens of *C. capitata* or of the other flies I had before seen were in either of the museums. Later, I met Dr. Eugene Autran, a professor of botany in one of the colleges in the city and also an assistant to Dr. Lahills in the Department of Agriculture and he recalled having reared a few flies from a kind of custard apple grown in a northern district of the colony; but he like the others, had no knowledge of any fruit fly occurring locally.

Outside of official circles, however, I soon obtained confirmation of the tales I had heard up the coast. In Paraguay and northern parts of the colony, I was told by men I met in the markets and by others, the peaches, guavas, and custard apples become infested; and a few market men said they occasionally noticed maggots in one or two kinds of locally raised peaches. A leading fruit grower, Mr. Robert Clark, told me that for the past few years a small proportion of one of the varieties of peaches he grew had been maggot-infested, but during the present season he personally had not seen any fruit thus damaged. He invited me to his farm which is at Quilmes about an hour's journey by train and cart to the south of the city. There he shewed me a number of trees of the special variety, but though there was an abundance of fully ripe fruit on them I was unable to find any trace of maggot work; the variety is a dry, white-fleshed free-stone. The conditions at Quilmes are not favourable to such a pest as the fruit fly, owing to the lack of other fruits than the peach, and the scarcity of shelter for hibernating adults. Mr. Clark has about 15,000 peach trees and only a few hundred trees all told of other kinds of fruit.

I was also fortunate in being invited to the Tigre, a peach growing area on islands at the mouth of the Parana River about an hour's journey to the north of the city. Mr. J. H. Hunter, my host on that occasion, has a fruit canning factory at Tigre and is besides the chief exporter of fruit from Argentina to England. Maggots in peaches, he said, first attracted his attention about four years ago. Previous to that he did not remember to have noticed any, although he had handled large quantities of peaches for nearly twenty years. The pest was not confined to any one variety, but so far had only been seen in the mid-season and late kinds. For three years the number of infested fruits increased, and he estimated that about ten per cent. of last year's crop after mid-season was affected. This year, however, the pest was not much in evidence. He most kindly chartered a launch and took me to an estate where he thought we might find peaches still on the trees; but we found only half a dozen and none of these were maggotty. I also failed to detect any trace of the pest in other kinds of fruit and had to leave without determining whether the insect is *C. capitata.* or some other species. The conditions in the vicinity appear to me all that are required to have *C. capitata* develop into a bad pest. Besides peaches, large quantities of apples, and many quinces, medlars, and some pears, naartjes and oranges are grown. Both Mr. Clark and Mr. Hunter have promised to send a quantity of infested fruit to Dr. Lahille next season should the pest appear, and Dr. Lahille has said he will have the flies reared and our Cape Agricultural Department made acquainted with the identity of the fly.

There was an abundance of peaches in the markets of the city during the whole of my stay, but I did not discover a single maggotty one. Indeed the only maggotty fruit I found was the custard apple called "cherimoia," and this fruit came from the Salta and Turcuman provinces in the north of the country. In one market I found over a hundred of these fruits spread out on a large table and in looking them over I failed to discover one not infested. Tiny holes, like pin-pricks, speckled the otherwise fair surface and betrayed the presence of the pest. Maggots were continually wriggling through these holes, and in a few minutes, without breaking a fruit, I succeeded in collecting several dozen specimens. The species, somewhat to my surprise, has proved to be *A. fraterculа.* Along with ninety specimens of the flies, there have also emerged eight specimens of the same parasite found in Brazil. It should be mentioned that a former chief in the Department of Agriculture, Señor Carlos D. Girola, in an elaborate report by him on the agricultural industries (Tomo I, No. 1, Investigacion Agricola en la Republica Argentina) very briefly alludes to this fly as an enemy of pears and other fruits. Señor Girola was away from the city at the time of my visit and I was quite unable to find anyone who could tell me on what his information was based.

A mishap to the vessel by which I took passage to the Cape, which necessitated a return to and detention for a few days at Montevideo, gave me an opportunity of making enquiries in Uruguay. The government officials I wished to see were not in when I called; and I failed to find anyone who had ever noticed maggots in the locally grown fruit. Peaches are produced in abundance around the city, and large quantities of pears and apples. Through the British Minister, I obtained an introduction to Mr. Frank Hudson, the General Manager of the Central Railways, a gentleman who, the Minister said, took a keen interest in fruit gardening and would be sure to know of the maggot pest if it occurred. Mr. Hudson most considerately took me to see his private garden in the suburbs. Peaches, he said, so far as his knowledge went, were always sound, the only insect liable to be in them being a small grub-like one which was sometimes found at the kernel of fruits of which the stone had burst open. It chances that Mrs. Hudson is actively interested in insects and has reared a large number including the Codling Moth; and that maggots should occur in any cultivated fruit in their vicinity and not be known to Mr. or Mrs. Hudson seems to me very improbable. Some areça mirims and another kind of guava were ripe in their garden and appeared wholly free of pest. One gentleman I met has a large cattle farm on the Rio Negro River in the centre of the country; and he said that maggots were sometimes observed in a few peaches there, generally in rainy seasons. He had seen no peaches similarly infested about the city.

SHIPMENTS OF THE PARASITE TO SOUTH AFRICA.

Mr. Fuller took with him on his return a large number of fruit fly puparia which he had reared, chiefly from pitangas, at Bahia, and about twelve hundred which I had reared from peaches, gauvas and other fruits in the state of Sao Paulo. Some of his material had pupated and had been put on ice over a week before the boat sailed, and mine had all been pupated four to seven days and had been in the cool room of the steamer four days. All was kept in the vegetable rooms of the steamer by which he travelled throughout the long journey of about forty-three days, and altogether was kept chilled between six and seven weeks. What he had collected was carried in soil, and what I gave him, in slightly dampened sphagnum moss. Without any exception, however, not one of the puparia yielded a fly or a parasite when the lot was finally placed under normal conditions of temperature in Natal. Too prolonged exposure to cold, or some unrecognised factor, had destroyed the vitality of every one. The few hundreds that I had reared from peaches and which by the test lot that I had retained were undoubtedly all or nearly all *Ceratitis capitata*, were opened by him when he saw that there would be no emergences; but in none did he find any indication of parasitism.

The larvæ from the areça mirims I brought along from Bahia and Rio de Janeiro began to pupate March 30th and finished April 7th. Those pupated up to April 3rd were put in an ice-chest on that date, and the remainder were put in on the 7th. Combined these lots numbered a thousand or more; and all were packed in dampened sphagnum moss in gauze covered jars. On the 11th they were put in cold storage on the Cape bound steamer and there they remained until May 15th when they were removed at Cape Town and forwarded to Mr. Fuller. The steamer had no vegetable or other cool room not chilled below the freezing point; but it was found that the air space in the wall of one of the meat rooms kept at a temperature of about 34, and I was permitted to keep my jars therein. From time to time the moss was given a little moisture to prevent the puparia from drying out. Nearly all of them had the appearance of being alive when they reached Natal, but Mr. Fuller informs me that nothing has emerged from any of them. The boat was a week late in starting, and its voyage to the Cape occupied a fortnight more than it should have done owing to a fire aboard. The fire led to fluctuations in the temperature of the meat chamber and the consequent decay of an immense quantity of meat and it is not improbable that one or more of these unforeseen happenings deleteriously affected the puparia.

As matters have transpired, the failure to introduce any specimens of the parasite alive this season has not been as disappointing as it might otherwise have been. To succeed in establishing the parasite it is presumably necessary that there be an abundance of maggots in which it may begin work; and it has so chanced that there was far less maggot infestation of fruit this year than is usual. If he had had the parasites Mr. Fuller would probably have soon lost them through lack of maggots for them to attack. All that he had in readiness were some in stored pears. Again, the disappointment is tempered by the finding of *Ceratitis capitata* so bad in peaches in Brazil, and by the doubt that the parasite will work in this species. When we went to Brazil, it was with the expectation of arriving at the height of the fruit season and of being able to collect supplies of the checks described by Mr. Compere in time for Mr. Fuller to reach Natal whilst there was still plenty of fruit in the orchards. Had he been able to leave Brazil a fortnight earlier, he could have reached home some weeks before he did, owing to the boat sailing that week offering an opportunity to shorten the voyage by transhipment at Madeira.

FURTHER WORK PROPOSED.

It is probable that Mr. Fuller will make arrangements for obtaining, from Bahia, during the coming December, large supplies of puparia reared from pitangas. The material should reach Natal early in February when an abundance of maggots are almost sure to occur in the local peaches. Both Mr. Fuller and I discussed plans with Bahia people with the view of getting supplies next season, and received kind assurances from Dr. W. H. Furniss and Mr. F. Stevenson that they would do what they could to assist. Dr. Furniss is the American Consul and a keen naturalist, and Mr. Stevenson, the British Vice-Consul and head of the firm having the agency of the line of mail steamers by which shipments would be made. Mr. J. Donald, the young man we had as interpreter, promised to undertake the collection of the fruit and the rearing of the puparia; and as we took pains to teach him how to proceed, we believe him capable of undertaking the work under the general supervision of Dr. Furniss. Messrs. G. E. Hudson & Co., the London agents of the Cape Fruit Exporters' Association would receive any supplies consigned *via* Southampton and transfer them at once to the cool chamber of the next Cape mail steamer; and it is quite possible that one shipment *via* Madeira may be arranged.

I hope to secure still more efficient aid through the Government of the State of Sao Paulo. Anticipating that this year's attempts would fail because of the lateness of the season if for no other reason, I approached Dr. Carlos Botelho, the Honourable the Secretary for Agriculture of that state, with the suggestion that the Cape Government might ask that Mr. Adolph Hempel, the entomologist and pathologist of the state agricultural institute (Institute Agronomico at Campinas), be allowed to assist us during the next season, and I received a generous promise that Mr. Hempel's services would be at our disposal. I had previously discussed the matter with Mr. Hempel personally, and had found him willing and anxious to help us. The Acting British Vice Consul at Sao Paulo, Mr. Charles W. Miller, is the local agent for the Royal Mail Steamship Company and in that capacity boards the Southampton bound steamers at Santos; I secured his sympathy in the work, and his promise to receive supplies from Mr. Hempel for forwarding to us. The peach season at Sao Paulo extends from December to about the tenth of February, and in this period I hope to have Mr. Hempel procure an abundance of puparia for us from this fruit. As explained in a foregoing paragraph, the chief fruit fly in the Sao Paulo peaches is our Cape species. To definitely determine whether or not this species is affected by *Opiellus trimaculatus* and other parasites, Mr. Hempel will be requested to rear large numbers of the flies from peaches under normal conditions of temperature. Therefore should for any reason the supplies of puparia we expect him to send fail to survive the exposure to the cold on their long journey or die from any other cause, we will probably at least learn next season whether or not it is of any use to try still another year. Some readers may think it highly improbable that a parasite of the maggots of one kind of fruit fly would fail to attack the maggots of another kind; and therefore that I have little reason to fear that *O. trimaculatus* does not attack *C. capitata.* However, at the Cape we have a Braconid, distinct from, but much resembling the Brazilian species, which we have never found in connection with *C. capitata,* but which we reared in numbers on one occasion from puparia of another kind of fruit fly. The parasite has not been studied. The fruit fly has been named *Dacus immaculatus* by Mr. Coquillett. The maggots were found in the fruit pods of an Asclepiad (milkweed) at Stellenbosch, in January, 1898.

CONCLUSION AND SUMMARY.

Mr. Compere's discovery of fruit fly natural enemies in Brazil has been investigated by Mr. Fuller and myself; and we are forced by our direct observations and by the results of our enquiries to conclude that Mr. Compere very much overestimates the efficiency of these natural enemies to hold fruit flies in check; and, to our further regret, we found that the information given to Mr. Compere to the effect that fruit flies do little damage in Brazil is utterly erroneous. Mr. Compere spent about four weeks on shore in Brazil and divided his time between Sao Paulo and Bahia. Mr. Fuller spent four weeks in the country wholly at Bahia. I spent four weeks at Bahia, two about Sao Paulo, and one about Rio de Janeiro. Mr. Fuller's report on his investigations is published in the *Natal Agricultural Journal* dated May 25th, 1905, (No. 5, Vol. VIII.); and it contains nothing of importance contrary to what I state in this report. My own general conclusions may be summarised as follows:

1. The fruit fly of South Africa, *Ceratitis capitata,* is a very severe pest in the states of Rio de Janeiro and Sao Paulo, and probably in other parts of Brazil where peaches are grown; practically all of the fruits allowed to mature on the innumerable peach trees in the states named nearly every year become infested by maggots, and this species of fly is believed to be the only one chiefly implicated. Some grounds for supposing *C. capitata* an introduction into Brazil were found.

2. A fruit fly, *Anastrepha fratercula,* of the same family as Cape species but generically distinct, is also a severe fruit pest in the states named, and in the state of Bahia; and this species is specially injurious to guavas of various kinds, pitangas, and some other native fruits. In some parts of Argentina, the same species is evidently a bad pest in custard apples.

3. Other species of the fruit fly family were reared from fruits and still others noticed amongst fruit trees, and these doubtless add to the injury caused by the two major species named; and, altogether, fruit flies as a class of insects appear to do quite as much damage in Brazil as they do in any part of South Africa. They certainly cause injury to a far larger proportion of the fruit grown than they do in the fruit districts of the Cape Colony.

4. The Staphylinid beetle considered by Mr. Compere to be the prime check on fruit flies in Brazil was not found; and I presume it

appears as a fruit fly enemy only under certain conditions. As it was not at work in the late summer months, and as fruit flies are distinctly pestiferous in the places where Mr. Compere found it, I have no hope that its value to us might prove sufficient to justify the expense of attempting its introduction.

5. A small parasitic wasp, *Opiellus trimaculatus*, lives at the expense of the *Anastrepha fratercula* species of fruit fly. From the rearing tests made by Mr. Fuller and myself it seems that this check finds a much larger proportion of the maggots in small fruits, as pitangas for instance, than of the maggots in large, pulpy fruits as guavas and custard apples; but the number of rearings we were able to conduct was insufficient to warrant a definite conclusion on this interesting point. The extent of parasitism in our experience varied from seven per cent. in rearings from guavas and eight per cent. from custard apples to thirty-eight per cent. from pitangas. We failed in our attempts to bring parasitised puparia alive to South Africa.

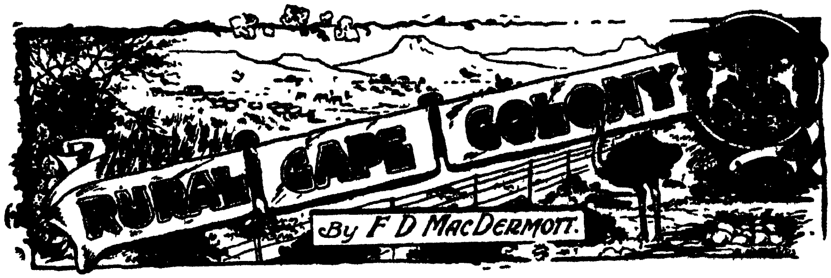
6. The parasite of *A. fratercula* may or may not attack *C. capitata.* What little evidence was obtained on this point was negative in character. No specimens were observed about peaches, the one fruit in which I was reasonably sure the maggots present were of the *C. capitata* species, none emerged with the twenty-two flies of this sort which I reared, and no trace of parasitism was detected by Mr. Fuller amongst the several hundred puparia that perished on the way to South Africa, but this negative evidence is inconclusive. What is needed is a succession of extensive rearings of flies from peaches throughout a season.

7. Several specimens of a small wasp, quite distinct from *Opiellus trimaculatus* but suspected to be parasitic on fruit fly larvæ, were observed near Sao Paulo crawling over peaches and in one case apparently ovipositing in a fruit. Hence though no parasites were reared out of fruit fly puparia from peaches, I have some hope that such do exist in Brazil.

8. Because of the possibility that *Opiellus trimaculatas* may attack *Ceratitis capitata,* and the further probability that this species of fruit fly may have another parasite at Sao Paulo, I think it justifiable to incur some further expense in attempting to introduce living puparia reared from Sao Paulo peaches; and therefore propose to complete arrangements with the Sao Paulo State Government for supplies during the coming season. I also propose to have large numbers of maggots from peaches reared under normal conditions of temperature to the fly stage in Brazil with the view of securing satisfactory evidence on the question of whether or not parasites affect *C. capitata.* Whilst there still appear these possibilities that fruit fly parasites exist in Brazil that might prove of some value against South Africa fruit flies, I no longer have any hope whatever that these parasites may be capable of holding our fruit flies in such

close subjection that artificial measures to save orchard fruits will become materially less necessary than they are at present.

9. Maggotty peaches are of uncommon occurrence in the great fruit districts about Buenos Ayres. It has not yet been determined what species of fruit fly is present, but steps have been taken to ascertain its identity during the coming season. Even if it is our *C. capitata* however, there is practically no hope that the factors which thus far have prevented it from doing extensive damage are such as we can introduce. The region was originally open grass country devoid of fruits in which the pest could breed, so in all probability the fly, whatever it is, is an introduction. In Paraguay and in northern parts of Argentina, peaches are said to get very maggotty.



NO. XVI.

THE DISTRICT OF OUDTSHOORN.

(Continued from page 355.)

The Furrows.

The intake furrows, for the most part, are just as simple in their construction, being usually cut into the bank of the river at the most suitable spot available near the weir. Although a good deal of silt is brought down by the streams, very few precautions are taken to keep it out of the furrows, and sluices are largely conspicuous by their absence. Not that the sluice gate is not appreciated; to say that, would be to libel a large number of very progressive irrigators, but owing to the comparatively plentiful supply of water available the number of sluices in general use is not by any means as large as one would expect. The spade plays the largest part in the irrigation work of the whole district. Some of the furrows carried through at great expense and trouble are, however most admirable. All along the Oliphants River from Oudtshoorn pretty well to Calitzdorp, the banks of that river are very thickly populated. Farm adjoins farm, and none of the holdings being very large, the road takes on the appearance of a village in some places. And the whole distance down, the never-ending furrows follow the track. Some are really canals, running from six to ten feet wide, and sunk so deep in places, in order to maintain the flow, as to call for bridges to carry the traffic. All these furrows and canals are admirably kept and their construction is good. But this part of the district is a comparatively easy one for the irrigator. It is when one gets away back into the mountain gorges and steep ravines through which the smaller streams flow that the real difficulties of the irrigator are shewn. One of the photographs herewith shews a view on the farm of Mr. Thomas in the Kamnatie Valley. To get the water on to his lands Mr. Thomas had to scarp his furrows in the side of the precipice as shewn in the illustration, and then build up and support them with rubble masonry, for a considerable distance round the steep hill-

Mr Thomas's Homestead and Citrus Orchard, Kamnatie, Oudtshoorn.

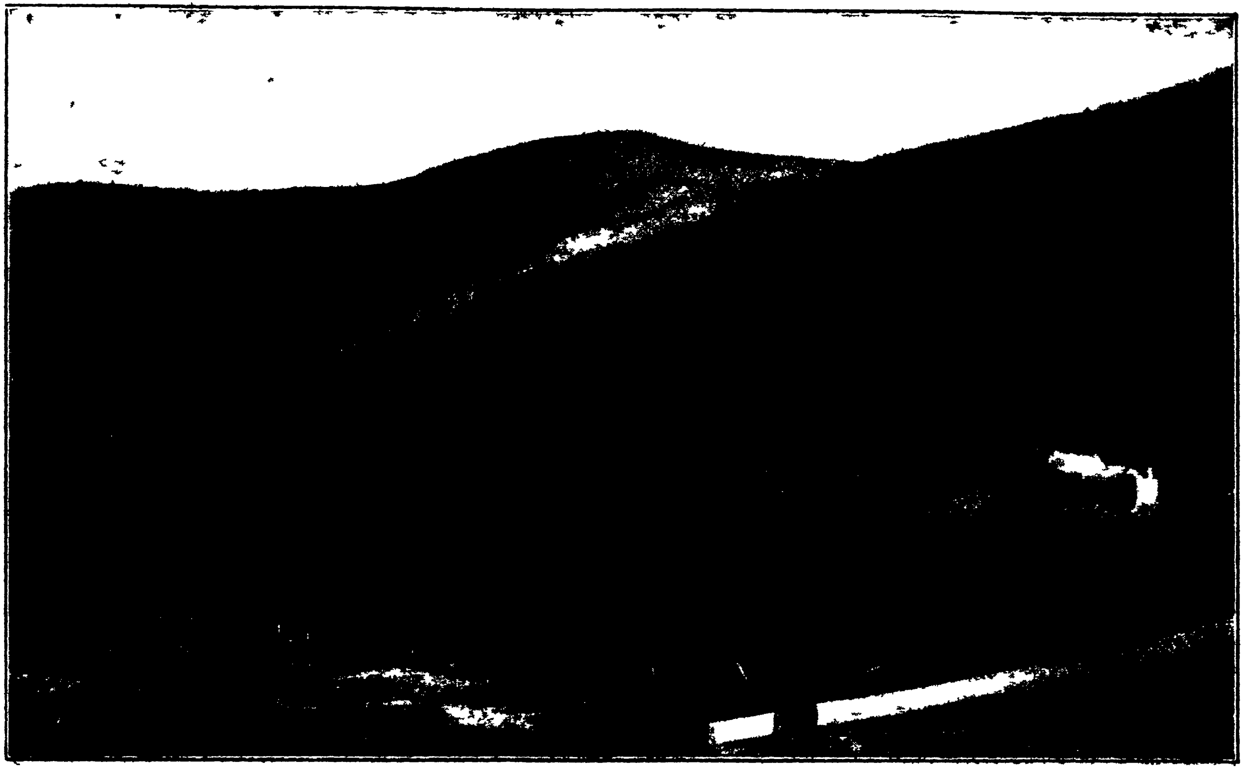
side above his farm. It is by such enterprising work as this that the irrigators of Oudtshoorn have managed to place themselves at the top of the tree for this kind of work in South Africa. When this is contrasted with the farm Armoed, on the Oliphants River, where Mr. Andries Muller has his beautifully situated homestead, overlooking a splendid view of most of the valley, it is seen how much the conditions vary in the different parts of the district. Armoed lies close to the river and the ground all about is comparatively flat; the result is that the question of water distribution cannot assume the serious proportions it does in a place like the Kamnatie farm owned by Mr. Thomas. Again at the lower end of the Kamnatie Valley, where Mr. Hans Le Roux has his fine farm with its splendid flocks of ostriches, and wide-spreading lucerne paddocks, the land is so flat in the lower parts that serious damage has been threatened more than once from floods. This farm stands practically at the junction of the two rivers, the Kamnatie and the Oliphants. Some years ago in a very wet season the rivers came down and owing to the heavy flow of water in the Oliphants, the Kamnatie was dammed back and spread itself out all over Mr. Le Roux's lands, flooding out the old homestead. Since then Mr. Le Roux has built himself the modern dwelling shown in the illustrations herewith.

View showing heavy work in furrow construction on Mr. Thomas's farm at Kamnatie.

AGRICULTURAL PROGRESS.

As irrigators the farmers of Oudtshoorn occupy a very high place, and their methods are simplicity itself and doubtless will, in time, be improved upon. But they have done wonders with the means to their hands and they are entitled to the highest praise from everyone. Where the necessity has arisen for the more substantial form of work no hesitation seems to have been shewn in doing whatever was within the means of the parties interested. The river at Oudtshoorn near the town, gives ample evidence of this, for in several places great pains have been taken to so shape the course of the stream in flood times as to give the maximum of ground to the riparian owner, and in doing this much care is also necessary, for the owners on either hand are all jealous of any infringement of what they may consider to be their rights. But with all this well-directed effort there is an absence of the higher forms of agriculture which are to be expected in such favourable circumstances. It is, of course, more than probable that the very favourable nature of the surrounding conditions has given rise to at least a certain proportion of these laxities. I saw a good deal of the district while I was there, and looked in vain for one drill-sown field of lucerne. A great many of the farmers are now growing lucerne for commercial hay and one would have expected to have seen at least one trial sowing in drills to compare the result with the broadcasting methods which have held so long. But I saw no sign of anything of the kind. The fact of the matter seems to be that everything is pretty well subordinated to the eternal ostrich and so long as that lordly bird rules the roost, so long will that condition remain. The methods of cultivating lucerne, their main agricultural crop, leave a good deal to be desired. The usual system seems to be, after thoroughly preparing the land, and, at least, rough levelling it so as to get it in order for irrigation, to broadcast the lucerne with a nurse crop of either barley or oats. When the nurse crop is taken off, the fields are usually mowed for awhile at least to get the weeds and grass under, then they are turned into permanent pastures for the ostriches. The cultivator is used to a great extent on some of the farms, but it is found difficult to deal with the rapid-spreading quick grass which invariably ends up by mastering the lucerne in the course of a few years. Then the whole work has to be done over again, the ground being first ploughed out and laid down to a rough crop like mealies in order to get it thoroughly cleared. It should be an interesting experiment for some large grower to lay down a good sized patch with the drill and see the difference after a couple of seasons of careful and constant cultivation and mowing. To make the experiment a success it would be necessary to keep all stock off it, and cut the crop, either for hay or for feeding to birds and stock in the green state, as required. I called among other places at the farm Welbedacht that used to belong to the late Richard Gavin, the pioneer of the lucerne industry, and there, it was very gratifying to see the advances now being made in the use of machinery and modern appliances. The Martin Cultivator, fitted with a special tooth for lucerne cultivation, has been in use for some time and is succeeding well, I am told. There are other cultivators at work too which do very well, but so far the Martin, with the spring tines, seems to give most satisfaction. Of course we all know that the ideal cultivator for lucerne has yet to be invented, and every grower of that crop is anxiously looking forward to the day when that implement will be put upon the market, but until that arrives we must all be content to put up with what is to our hands, and in this case Oudtshoorn seems fairly satisfied with the Martin. The new teeth used are made to suggestions supplied by Mr. Edwin Edmeades, a large farmer of the district and chairman of the Farmers' Association, and Mr. Thomas of Kamnatie, one who has always taken the keenest interest in anything that will forward the lucerne industry. At the same farm, Welbedacht, I saw another new baling press, which was described by Mr. Ernest Edmeades, the nephew of the late Mr. Richard Gavin, who has inherited this property, as a great advance upon the " Eli " baling press and all the others that have come into the market. I did not see it at work, so can express no opinion one way or the other. It looks a very businesslike machine and when one hears that it is supposed to turn out the bales as fast almost as one can count, it impresses one a little with its capacity. This baler is called the " Whitman Steel King," and is made by the Whitman Agricultural Co. of St. Louis, Mo , U.S.A. It is driven by a small oil engine kept specially for that purpose. Another special feature worth noting I saw here, was the method of storing the lucerne hay. Instead of stacking in the open, a great deal of it is kept under cover in barns and outbuildings. Whether this is an advantage or not I could not say; all the hay that I saw so treated was in excellent condition and exceedingly sweet and fresh. But so is that stacked in the open, provided it is properly stacked and in good condition prior to being stacked. The Canton baler is also largely used in the district, as is the ever-popular Planet junior cultivator. Dodder does not seem to be very troublesome now in the lucerne because it is usually subjected to such drastic treatment on the first indication of its presence. One favourite method is to treat the infected patch with sulphate of iron, and then burn it to the ground, re-sowing afterwards to restore the crop. It would be a persistent parasite that would stand much of such treatment and survive. The caterpillar of the lucerne moth seems to be the most troublesome pest the district knows, but this is not entirely beyond control, for the ostriches as well as nearly all kinds of domestic poultry eat them greedily when they get the chance. Advantage ought to be taken of this circumstance to try and keep this pest within bounds. It should not be a difficult task, because the birds are mostly on the spot, and, with a little reinforcement in the shape of domestic poultry, should soon be able to account for the greater proportion of these insects.

General View of Mr F. E. I. Edmeades' Homestead at Kunnatie with Lucern Stacks, &c.



Field of Tobacco in the Hazenjacht Valley

Cereal Crops.

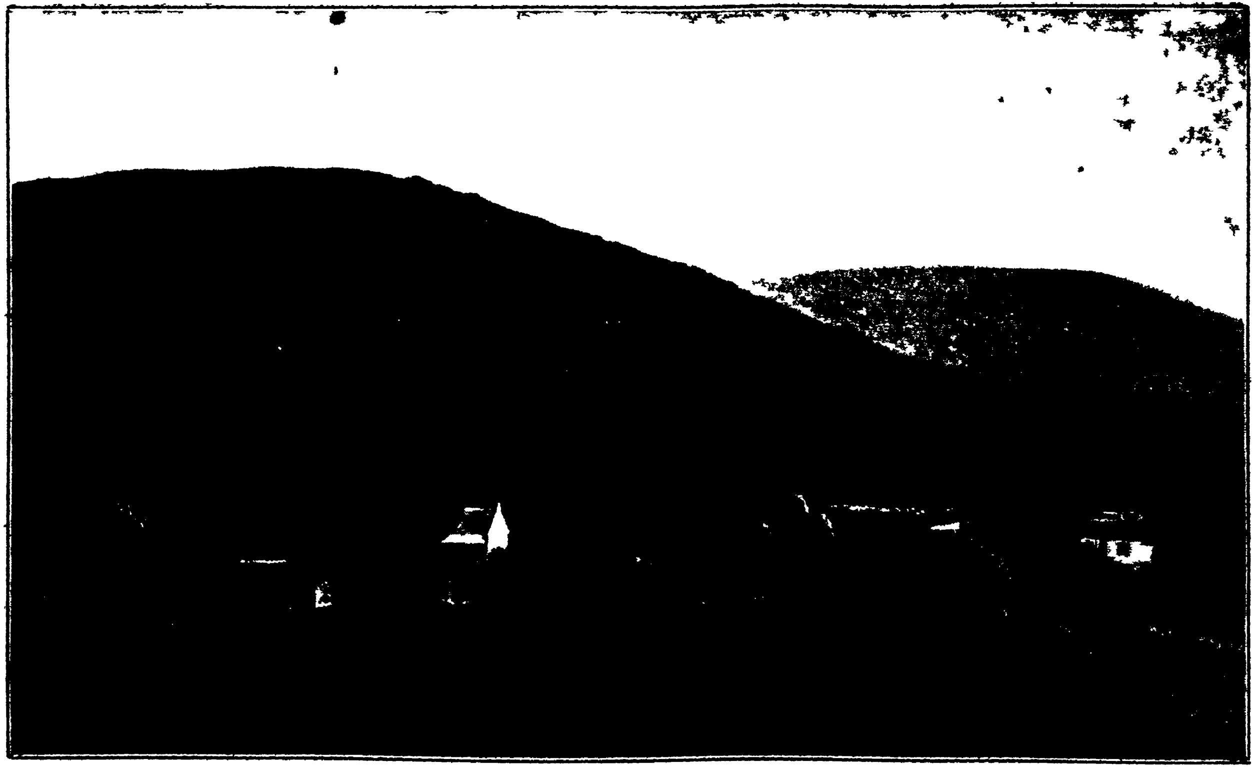
Of the cereal crops raised in the district wheat seems to be about the poorest. This is largely accounted for by the fact, vouched for by several experienced farmers, that wheat will not thrive after a crop of lucerne has been established in ground for say five years and has been regularly grazed by ostriches. It would be interesting to find out why this should be, or whether it is merely one of those traditions which die so hard in all communities. The other cereals all do well, oats, barley, rye, and maize, but wheat, it is positively asserted, will not mature. It grows to a certain age then begins to die off, and the longer the lucerne has been established in that field the less the wheat is said to thrive. Some thirty years ago wheat used to be very largely grown under irrigation along the Oliphants River, but it has gradually dropped out with the extension of the lucerne. In those days it was freely sold at prices ranging from 10/- to 15/- per bag and for some time stood as low as 7/6. Down below Welbedacht and that direction the crops used to be vines and wheat entirely. From Schoeman's Hoek to the Cango the crops were mainly mealies, beans, tobacco, bamboos, &c., and for their cereals these people nearly all had sowing farms along the Oliphants River. All that is changed now, however, thanks to the ever-present ostrich. Though cereals in the shape of barley and mealies are still largely grown they appear mostly as clearing and nurse crops for the lucerne.

The Tobacco Industry.

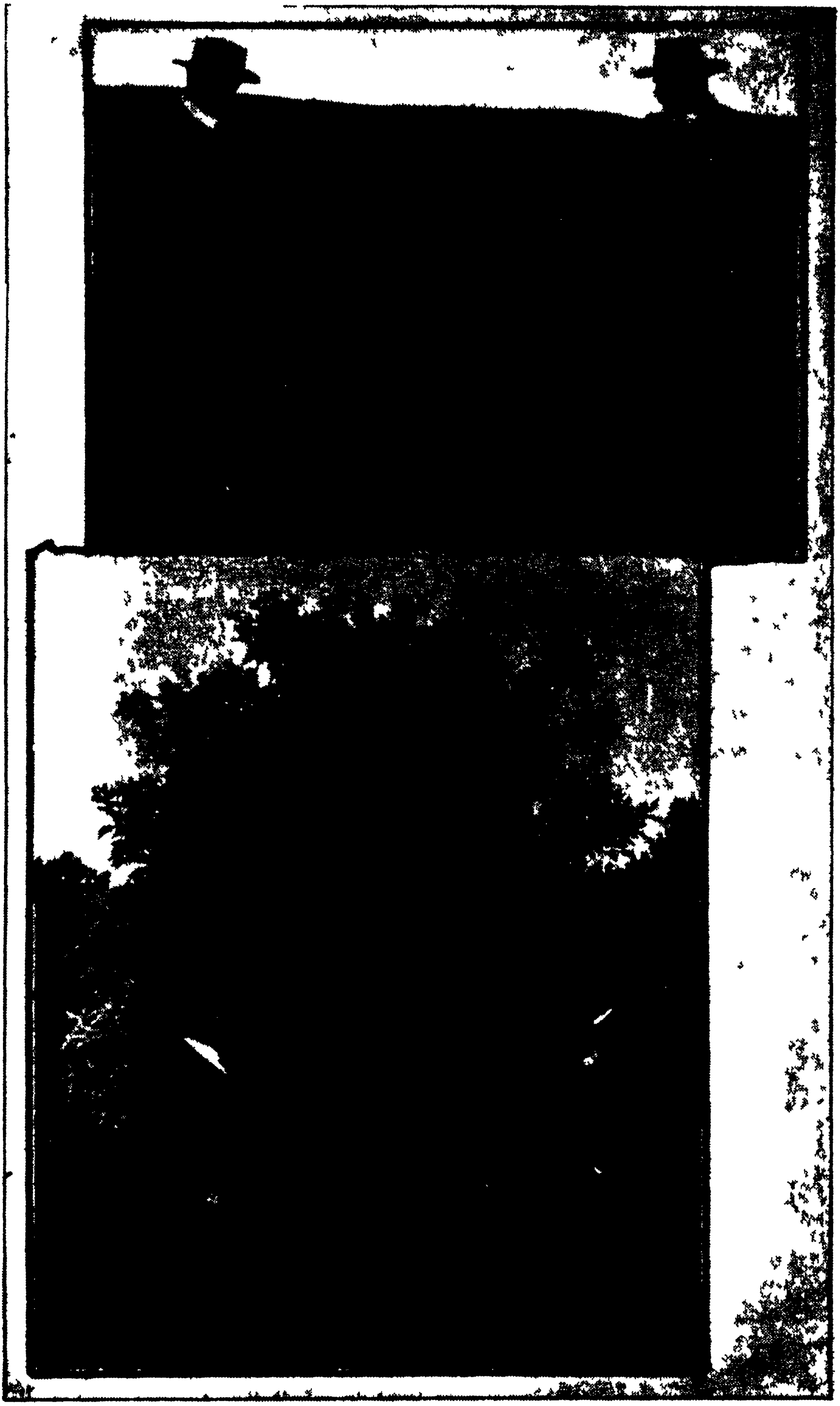
The next most important industry to lucerne and ostriches in this district would appear to be that of tobacco growing. Nearly every farm in the district produces tobacco, more or less, and the gross output for the year ending March, 1904, shewed the enormous total of 1,214,324 lbs. weight. This is more than double that of the next largest tobacco producing district in this Colony, viz., Stockenstrom, and about one-quarter of the yield of the whole of the Colony. On some of the farms it is the most important crop, this is particularly the case on the farm Vergelegen which I visited in company with Mr. E. T. L. Edmeades. Here tobacco is grown on a very large scale indeed, and the crop this year promises to reach the eminently respectable total of between 60,000 and 80,000 lbs. When it is realised that such a crop will realise an average of about 6d. per lb. all round, it looks like a payable proposition. The estimated average yield of a good crop in this valley is given at 3,000 lbs. per morgen for the first cutting, and from 1,500 to 2,000 lbs. for the second. No attempt is made to manufacture the tobacco on the farms now. This used to be done years ago, but since the institution of the two large cigar and tobacco factories in the town of Oudtshoorn with their full equipment of machinery and modern appliances it is found more economical to leave that part of the work to those most fitted to carry it out. This crop is largely grown on the share system by the bywoner class and an excellent thing many of them make of it. A good deal of trouble is involved in its cultivation, but the return is so good that a man can afford to give more attention to a smaller piece of ground than he would care about giving to the same extent of other crops. Apart from the ordinary routine of attending to the details of the irrigation work, which is always with the farmer in the Oudtshoorn District, in growing tobacco he has first to carefully germinate the seed in specially prepared seed-beds. Then the seedlings have to be planted out and tended until the plant is ripe for cutting. When the crop is harvested it has to be hung in bunches till it is properly dried and afterwards sufficiently prepared to fit it for the manufacturer. All this calls for the greatest care in the process, and for a certain amount of skill and experience as well, for any mistake of judgment may cause heavy losses on the crop. One misses the elaborate methods that are described in other tobacco-growing countries, but as the plant thrives just as well here without them it can only be concluded that nature has again been lavish in her favours to the people of Oudtshoorn. In place of the carefully fitted cheese-cloth shelters for raising the seedlings the Oudtshoorn tobacco grower is content to cover his young plants from the more fierce glare of the sun with a few bushes so laid as to break the worst of the heat rays. And his drying houses consist mainly of a few stout stakes sunk into the ground with a covering of reeds to keep off the sun. These drying houses are open to the air on all sides and the operation of drying the leaf is thus carried on in the most natural manner possible. Some very fine samples of White Burley and other imported varieties were shewn to me by Mr. Edmeades at Vergelegen, where tobacco seems to thrive remarkably well. While at the tobacco factories at Oudtshoorn the quantities being made up seemed so great and the quality so good, that one began to wonder where it was all consumed. Someone laughingly suggested that it was exported to the Transvaal to supply the Colonial demand for "Real Magaliesberg." Whatever may be its ultimate destination the quality is undoubtedly good and most of it would rank with the best of the products of this country.

FRUIT CULTURE.

In fruit the principle products are Citrus Fruits and Walnuts. This was the district that was so little satisfied with the work of the Citrus Commision that a special request was made for the visit for a second time of one of the Commissioners. As it happened the Commissioner, Mr. P. J. Cillie, of Wellington, and I were in the District at the same time and we met on several occasions at the various farms. While at Mr. Edmeades's splendid farm at Kamnatie Mr. Cillie made a very close inspection of the citrus groves there, and saw some startling examples of the futility of the Bitter Seville stock. One is shewn in the photographs on another page where I caught Mr. Cillie and Mr. Edmeades discussing the whole question



View of Homestead at Vergelegen, with cultivated lands, Lucerne Stacks, &c



An Object Lesson — 1 Bitter Seville Stock 2 Cape Seedling same age.

with examples before them. In the one view they are standing over a Brazilian orange tree which was grafted on the Bitter Seville and planted some six years ago. The growth speaks for itself. Underneath they are standing by a Cape Seedling of the same age, and the contrast in development is somewhat marked. As a matter of fact the seedling varieties have done ever so much better in this district than any of the grafts, and in some of the groves they have grown to enormous sizes. There has been a good deal of trouble with mal-di-gomma in some of the orchards but most of it seems traceable to ill-regulated irrigation, and in those cases where the instructions of the Citrus Commision have been carried out the disease has soon disappeared. The case quoted by Mr. Cillie in his supplementary report I visited with him, and was surprised to see the remarkable recovery from what seems to have been a desperate condition. The grove belongs to Mr. F. Geyser, of Schoeman's Hoek, and the trees are from 50 to 75 years old. The farm was visited by the Citrus Commission in 1903, and the trees were so badly affected that the owner was on the point of cutting them all down. The Commission, however, advised him to open up the roots, and get them well exposed to the light and air. He did so with the result that the trees have quite recovered, though shewing ugly scars from the wounds, and were bearing a heavy crop of fruit on the occasion of my visit. There can be little doubt as to the efficacy of this remedy for root-rot or gum disease, for wherever I have seen it tried it has succeeded.

But the Bitter Seville stock has proved, according to one critic, nothing but a bitter disappointment. In the groves mentioned above, those of Mr. Edmeades at Kamnatie, I saw Washington Navels, Bahia, St. Michael, Blood, Sustenance, Abundance, Sutton's White, Joppa, and Brazilians, all on Seville stocks, and not one was thriving. In fact the majority seemed to vie with the one shewn in the photograph herewith. In his garden at Oudtshoorn too, Mr. Edmeades showed me a number of other varieties all equally bad on the same stocks, while the Cape Seedlings make magnificent growth and though they are later in coming into bearing they bear such enormous crops when they do, that they more than make up for it. This experiment in stocks has cost Mr. Edmeades alone upwards of £200, and like all who have gone in for it he is rather sore on the subject. The orange crop is a very important one to the district as a whole, for there are groves on every hand, some well planted and looked after, others with the prospects of trouble before them through being planted too close together, or too deep, or in such a position as to preclude the requisite sub-soil drainage where irrigation waters are so freely used. The yearly estimated yield of citrus fruits for the district touches a couple of million fruits, and as the conditions are all so favourable there seems no reason why that total should not be doubled within a few years. But fruit on a commercial scale as a regular orchard industry has yet to be established in the district. Among the sights of this section some of the old seedling oranges rank as the most remarkable. One old tree was pointed out to me on the Hazenjacht River that holds the reputation of being the most prolific cropper in the whole countryside. It is asserted positively that it has cropped as high as 13,000 fruits in one year. And for seedlings the oranges are of excellent quality, being well-flavoured and sweet to the palate, with very little excess of "rag."

Walnuts have been a good crop and seem to pay very well once the trees come into bearing. They usually bear in about seven years, but the yield is not very large until they are much older. They make such a handsome tree that those who cultivate them can be forgiven for paying so little attention to the commercial side of the question. There are some magnificent trees at Mr. N. Botha's at the Cango, which are thirty to forty years old. These trees beside forming such a striking feature of the landscape, yield on an average some 300lbs weight of nuts each per annum. The average price of the nuts works out at very nearly sixpence per pound, so the return is not by any means a bad investment.

Chestnuts also used to be very plentiful in this district, but there are very few now except at Kombuis where they seem to thrive splendidly. One group of these handsome, wide-spreading trees on the property of Mr. W. Deas, at Cango, is one of the sights of the neighbourhood, and visitors to the Cango Caves should not miss seeing them. The trunks measure some twelve feet in diameter, and the trees must stand at least sixty feet in height. Some fifteen to twenty years ago chestnut trees in the district started dying out and no one seems to have fathomed the reason of this. At the Cango, however, and at Schoeman's Hoek, they still stand and shew no signs of falling away. The timber used to be highly esteemed for its durability. As gate posts it is said to have no equal, as it has been tested after being in the ground so long as eight years and found to be as solid as the day it was put in. It seems a pity that this splendid timber and shade tree was not preserved.

Of the other fruits which are grown in the district, peaches and apricots do very well, a large quantity of both being dried, and some are canned, but there seems to be no attempt as yet made to place this industry on a commercial footing. Almonds are said to do well here, but are rather neglected. The mouse birds are credited with reaping the bulk of the crop, and this may account for some of the neglect, but a great many almond trees have been put in recently and this crop may be expected to assume larger proportions later on. Apples and pears are, practically speaking, entirely neglected.

VITICULTURE.

The district of Oudtshoorn has been so closely identified with the viticultural industry of the Colony for so many years, that I made close enquiries under this head and found that the vine still plays an important part in its cultural features. Most of the vineyards, however, are small, and I found that viticulture is nowhere carried on as an industry on anything approaching a commercial scale. Firstly, the section is fortunate in being free of phylloxera, but oidium was very troublesome at one time until it was overcome. The first idea in planting vines is to provide "mos confyt," a kind of grape sugar syrup, which is given as part of their rations to the coloured labourers. Next, most of the farmers like to have a few raisins, and the raisin industry is growing into serious proportions on the commercial side as well. After this the next desire is for a natural vinegar, and some of the farmers make light wines, while others again like a sweet wine. The balance is then turned into brandy. At one time Cango Brandy had quite a vogue in this country, and had the product been kept up there can be little doubt but that an industry of some dimensions would have been established. It first came into prominence in the Frontier wars, when it was difficult to get liquor of any kind to the troops, the transport being such a serious matter. "Cango" in those days was a really first-class grape spirit distilled from the whole product of the grape, but as its popularity increased and the demand with it, imitations were soon forced on to the market, and the original article suffered in reputation. The Cango district was turned to other crops, and the Oliphants River farmers planted vines, but the product was never equal to the original, and "Cango Brandy" has gradually fallen from its high estate. The short-lived industry, however, has left its mark behind in more than one direction. The most prominent, perhaps, is the prolific growth of Rhenosterbosch, which now adorns

Vergelegen—Old Dutch Homestead on the Hazenjacht the hills and plains of Albany around Grahamstown. When the brandy trade was in full swing the farmers used to ride it in their ox-wagons to the Eastern Districts, and as the casks needed dunnage to keep them in position, they used the prolific Rhenoster. When the wagons were off-loaded the dunnage was dropped anywhere, at the most convenient spot Hence the forests of Rhenoster, which are eating up some of the best veld in the Eastern Province, for it thrives there amazingly, and makes better growth than in its native soil. That vines are a paying proposition in these parts there can be little doubt. One instance given me shewed the following results :—Two morgen of land gave, a couple of years back, 8,000 lbs. weight of raisins, which sold at 4d. per lb., £133 6s. 8d.; grapes were sold to the value of £9 10s.; and two leaguers of brandy, at £20 each, £40; or a total return on the two morgen of £192 16s. 6d. It does not follow that every morgen laid down to vines gives the same or equal returns, but the bulk of the vineyards do not fall far short.

THE NEED FOR ORGANISED CHEMICAL RESEARCH IN CAPE COLONY.

(By Chas. F. Juritz, M.A., Senior Govt. Analyst.)

Read before the British Association for the Advancement of Science, Cape Town, 25th August, 1905.

To one habituated to the ceaseless energy which characterises every branch of scientific research in the older countries of Europe, but as yet unacquainted with the conditions and difficulties which confront the scientist in this Colony, the comparatively scanty attention which is being devoted to problems in applied science, and the practical absence of all research in matters of pure science may cause a considerable amount of amazement.

INADEQUACY OF RESEARCH HITHERTO.

South Africa is, it is true, not absolutely devoid of institutions whose functions are to promote research, and to record the results thereof, but these bodies are limited in many ways. In the Cape Colony two such Associations exist; one, the South African Philosophical Society, founded twenty-seven years ago, took the promotion of original research as its watchword:* but the science in which we are just now specially interested—Chemistry—was omitted from the list of sciences particularly recommended to notice,—a list which comprised only "the Natural History, Physical condition, History, Geography, Statistics, Industrial resources, Languages, and Traditions of South Africa."† There were further restrictions; Sir David Gill, in his annual address to that Society, delivered on the 30th July, 1880, referred to the fact that, of the already small percentage of men naturally fitted for research, many were prevented by business and other causes from following this natural bent, and so he recommended the acceptance of *all* original contributions to science, not rejecting even those which were not original.†

Thus it comes about that if we scan the records of the Society mentioned, we shall find amongst its transactions very few papers that are strictly confined to original researches, and as for chemical research, one doubts whether more than five papers dealing with any problem in chemistry have been read during the twenty-seven years.

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* Trans. S.A. Phil. Soc. vol. 1, p. ix.

† Ibid. vol. 2, p. xxiii.

Another institution of kindred character held its first meeting in Cape Town about two years ago. That Association, also constituted "to give a stronger impulse and a more systematic direction to scientific enquiry," and furthermore "to obtain a more general attention to the objects of pure and applied science" * is undoubtedly better equipped than was the older Society at its inception, with facilities for promoting research work, and places the study of chemistry upon a higher platform. The records of these two institutions bear scarcely a trace of any chemical research beyond what originated as a mere side issue from other work in which the investigators happened to be engaged.

Just half a century ago Dr. Pappe published an enumeration of South African medicinal plants, in the preface to which he remarked that, judging from the vast extent of the South African territory, and from the richness of its almost inexhaustible flora, it was certain that many highly useful drugs would still be discovered. He added "the greater part of our information on this point we owe, not so much to scientific research, as to the experience of the Colonial farmer, residing in the more remote parts of the interior, to occasional travellers, or to the wandering native." † Fifty years have passed, and it is still even so to-day: the many drugs still await discovery, chemical research into their nature and properties there has been next to none, and we still owe practically all the information we possess on this subject, to the farmer, the traveller, and the native.

PROGRESS OF CHEMICAL SCIENCE IN LAST THREE DECADES.

On three notable occasions during the last thirty years, the progress of scientific knowledge in South Africa has been prominently reviewed in public. The relative importance assigned to chemical science on each of these occasions is instructive. The wet blanket, which stifles all chemical investigations in this Colony, is that, when they are undertaken at all, the scientist labours under the disadvantage of a grossly exaggerated "purely commercial" or "practical view" of his duties. To this view the late Sir Bartle Frere, when Governor of this Colony, used to take strong exception. As President of the South African Philosophical Society, he confessed that, in his eyes, such a view had always appeared—like everything which ignores facts and consequences—short-sighted economy and eminently unpractical.‡ So firmly did Sir Bartle Frere believe in the importance of research for its own

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* Report S A. Asscn for Adv of Sc 1903, p 9.

† Pappe. *Flora Capensis Medicæ Prodromus.* 2nd ed. 1857, preface, p. v.

‡ Trans. S.A Phil Soc. vol. 1. p. xxiii.

sake, that, ere the Society whose first President he was, had attained its third year, he hinted that it had, till then, hardly justified itself by its works.* This led Mr. J. G. Gamble, then Hydraulic Engineer to the Cape Government, to read before the Society a paper on "some of the problems awaiting scientific research in South Africa" (November 3rd, 1880.)* Even then, after dealing with meteorology and geology, a few chemical questions were briefly disposed of under the heading "miscellaneous."

Fifteen years later than the date of Mr. Gamble's address, the state of scientific research was once more brought prominently forwarded by Dr. Marloth in his annual address as President of the Philosophical Society.† Between the respective titles of Mr. Gamble's and Dr. Marloth's papers there was a significant difference; the former dealt with the problems awaiting scientific research, the latter confined itself exclusively to *natural* science: and why? The distinction was deliberate, because of the important investigations in the realm of astronomy that had been pursued in the interval: there was now in South Africa, said Dr. Marloth, "at least one place where scientific research has a real home." The reference was to the Royal Observatory. Would that I could say the same to-day of the Chemical Laboratories under my charge; but that would scarcely be true: we are unfortunately too "commercial," too "practical," and the exigencies of every moment, as it comes, put an effectual bar before anything of the nature of painstaking, deliberate research. Let it be admitted, however, that Dr. Marloth was justified in speaking of an advance of scientific research; a careful perusal of his paper will reveal the fact that, while mentioning astronomy, meteorology, geology, palaeontology, botany, zoology, entomology, ethnology, and bacteriology, the writer, himself an analytical chemist, was significantly silent regarding chemistry, with two casual exceptions.

Eight years after the publication of Dr. Marloth's remarks on the progress of Natural Science, Dr. P. D. Hahn, as President of the Chemical section of the South African Association for the Advancement of Science, dealt with certain features of chemical research in South Africa ‡ Again the lament was uttered that "in South Africa there are very few, if any, to be found, who have time, leisure, means and energy for carrying on original research." But the very fact that Chemistry at length formed the sole subject of such a review was in itself a hopeful indication. Mr. Gamble, in 1880, had reviewed scientific research in general; Dr. Marloth, in 1895, had found a sufficiency of material in Natural Science to warrant the restriction of his review to that alone; Dr. Hahn in 1903 had enough to deal with in confining his observations to Chemical Science.

A clear indication of the scanty attention that has been paid in the past to questions of a chemical nature in this Colony is afforded by a perusal of the interesting hand-book compiled by Rev. Dr. Flint and Dr. Gilchrist in connection with this very series of meetings. The testimony of silence on such questions is most eloquent.

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* Trans. S A. Phil. Soc. vol. 2, pp. 91 to 99.

† Ibid., vol. 8, pp. civ. to cxxi.

‡ Report S A. Assn. for Adv. of Sc. 1903, pp. 37 to 52.

Professor Hahn, as a teacher of Chemistry, complained, in the address already mentioned, that his time was so fully occupied with imparting instruction that he was unable to do full justice to these duties, much less had he any leisure for research work. Yet he alluded, in the course of his address, to researches that had been performed by his students in connection with viticulture, tobacco growing, the chemistry of fermentation, and mineral chemistry. Whilst not wishing to detract from the value of any such investigations, I would say that they are not of the nature of organised, systematic research work, which should not pass from hand to hand, but must be continued over prolonged periods of time by the *same* persons.

Dr. Hahn emphasised the need of workers who, on the one hand, possess the thorough training in theoretical and practical chemistry requisite for such research, and have likewise the needed leisure for a work involving more time and attention than any other scientific occupation.

WANT OF LEISURE FOR RESEARCH AMONG TEACHERS.

If we look about for men whom we may reasonably expect to undertake chemical research in this Colony, we shall, I think, discover that they fall in two classes: firstly there are the Professors and Lecturers engaged in teaching chemistry in the various colleges, and then the analysts employed in the Government Laboratories, of which institutions there are two, one in Cape Town, and another—which narrowly escaped extinction during the last session of the Colonial Parliaments—at Grahamstown.

I shall let Professor Hahn speak on behalf of the teachers. In the address just alluded to he says,—" It is only a few months ago that objections were raised in certain quarters to the establishment of a chair of Botany, because it was held that the time of the Professor of Botany would not be fully occupied by teaching. If it is expected of a Professor to have his time fully occupied by teaching, he cannot be expected to devote a portion of his time also to the prosecution of the numerous problems in his sphere of learning which call for investigation and research. It is therefore much to be regretted that, under the present regime, the Professors of the Colleges are so fully engaged in teaching that they cannot follow up original research into the many problems and subjects which present themselves, particularly in a young country like South Africa, to the student of science, and particularly to the student of chemistry." *

GOVERNMENT ANALYSTS AND RESEARCH

Failing the teachers, we turn to those employed in chemical work in the Government Laboratories; one instance may suffice to illustrate how little hope of success there is in that quarter unless present conditions undergo a radical change. As the officer in charge of these institutions I recommended several years ago a systematic chemical survey of the soils of the various districts of the Colony with a view to ascertaining their agricultural capabilities. I fondly hoped that I would be able to conduct these investigations in person. Vain delusion! The first difficulty that confronted me was the impossibility of making the analyses as complete as was desirable, partly for the reason that, of several districts, each one wanted its own soils examined first, and partly because impatient members of Parliament kept asking Ministers, "What are these scientific men doing?" and so immediate results were wanted to lay before them. Hence the physical examination of the soils, which should always supplement chemical analysis, went by the board at the very start.

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* Report S A. Asscn. for Adv. of Sc. 1903, pp. 42 and 43.

To continue a connected series of investigations such as those I had commenced became practically impossible, and perforce they were ere long passed over to my chief assistant.

The chemical survey of our soils went slipping lower and lower down the list, until it became a recognised thing that this, the only research work that we were doing, should be left in charge of the junior professional officer on the staff. Then came the war, and the unsettled state of the country put a stop to all journeys for the collection of soil samples. When hostilities ceased, and their immediate effects passed away, I trusted to be able to resume the soil survey, but a financial depression with its concomitant retrenchment approached, and I was instructed forthwith to cease all such non-remunerative investigations.

When called to give evidence before the recent Agricultural Commission I endeavoured to emphasise the importance of the suspended research, and pointed out that, with the increase of other work it could not be resumed unless my staff were augmented by one or two more analysts; the Commission was sympathetic and reported accordingly, but ere the recommendation could be acted upon, Parliament met, the "commercial" spirit was strongly in evidence, and, so far from any augmentation of my staff being acceded to, a Budget Committee, with a stroke of the pen, decided that the services of three of my already too small staff should be dispensed with. I think no more typical instance than this can be given of the almost insurmountable difficulties connected with the performance of chemical research work in this country.

I would now dwell very briefly on some of the investigations which have been made, touching also on the needs that they have revealed for further research.

Supposed Deficiency of Phosphates in Colonial Soils.

Several years ago I undertook a short investigation into the chemical composition of fodder plants grown in this Colony. Amongst these, I examined samples of oathay from Port Alfred, near Grahamstown. All the oats in the neighbourhood were stunted and sickly in appearance, and the ash yielded, on analysis, a mere trace of phosphoric oxide. The obvious inference was that the cause of this deficiency lay in the soil, and in reporting on the circumstance, I mentioned this theory, commenting upon it also later in a public lecture. Some three or four years after this I had the opportunity of analysing certain soils from the neighbouring districts of Albany and Humansdorp, and the results which I then reported to Government * bore out my previously expressed view, namely, that the soil in certain parts of the Eastern Districts of the Colony was poor in phosphates available for plant nutrition; that the fodder was similarly deficient, and that probably the animals feeding thereon would be seriously affected in course of time. These expressions of opinion, subsequently appearing in the public press, took a firm hold upon popular imagination, and lost nothing in the process of circulation. It was a limited area of country that was referred to by me in the first instance, but since then it became so exaggerated as, without due cause, to embrace the whole Colony.

Quite recently what had become a popular fallacy on the subject took a new and rather unexpected shape. In the Division of Middelburg a large military establishment exists. Amongst the horses there appeared a disease which was at once, in a most sweeping manner attributed to deficiency of phosphates. The military authorities, impressed with the delusion that Cape oats contain but little phosphoric oxide, and—what I certainly had never ventured to assert—little lime, resolved to have absolutely nothing more to do with Colonial oathay. Much concern seized upon the grain farmers, who promptly appealed to Government for relief. A Government enquiry was ordered, and, as a result, four samples respectively of Algerian, South American, Canadian and Australian oats were submitted to me, together with one from Malmesbury Division, Cape Colony, for comparison. As regards lime, all these samples were found to contain normal amounts; of phosphoric oxide, the ash of the Canadian and Australian oats contained about 22 per cent., which agrees with the published result of European investigators, whereas the other three samples contained only about 15 or 16 per cent). All that this investigation—if such it can be called—shewed, was that the single sample of Cape oats examined closely resembled the Algerian and South American oats; but all these three differed from the Australian and Canadian samples in containing less phosphates, though not so much less as to account for a sudden onset of bone disease in cattle—a bone disease, by the way, which the Colonial Chief Veterinary Surgeon, does not believe to be in the least attributable to want of mineral nutriment in the fodder.

As a basis for judging the nutritive value of Colonial oathay, the analysis of a single specimen from one Division of the Colony is highly ludicrous. Dr. Nobbs, Agricultural Assistant in the Department of Agriculture, sensibly enumerates twelve grain-growing divisions from which samples should be procured; and if such an investigation is to be at all convincing, some four or five samples should be collected from various parts of each Division, and this should be done regularly, season after season, for several years in succession. Only then could one draw conclusions as to how Cape

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* C G H. Report of Sect. for Agriculture, 1891-2, p 15, and C. G. H. Report of the Senior Analyst 1892, pp. 5 and 6.

oats compare in nutritive value with the cereal in other parts of the world.

To perform these and kindred investigations is out of the question when the analytical requirements of a country twice the size of the United Kingdom have to be met by means of two laboratories, with a total staff of five analysts, of whom at least three are constantly occupied with food analyses under the Adulteration laws. Hence, if there is to be organised chemical research, it must not be polished off in the usual cursory manner, of which the foregoing is a typical instance, but it will be absolutely necessary to provide a staff numerically large enough to undertake the solution of such problems as these without any interference with ordinary routine chemical work.

SYSTEMATIC INVESTIGATION INTO COMPOSITION OF COLONIAL SOILS.

It was on account of the facts already mentioned, brought to light with respect to the deficiency of phosphates in certain soils, that I recommended to the Government* the systematic investigation into the soils of the several Divisions of the Colony, which has now, unfortunately, been in abeyance for nearly five years. In this way the soils of the following Divisions were examined, with the results shewn in the table :—

Division.		No. of Samples	Area of Division in Sq Miles.	Percentage in Soil sifted through ½ mm sieve			Percentage in Soil through 1 mm. sieve.
				Lime.	Potash.	Phosphoric Oxide.	Nitrogen.
				Per cent	Per cent	Per cent.	Per cent.
Cape	..	25	663	·20	·12	·030	·090
Malmesbury	..	54	2,329	·10	078	·048	071
Caledon	.	30	1,772	·053	·071	·054	·15
Bredasdorp	..	21	1,577	·20	11	020	·15
Swellendam	..	37	2,362	·38	14	·046	·11
Robertson	..	27	1,526	·41	·18	·068	·11
Riversdale	..	24	1,712	·18	23	·089	·061
Mossel Bay	..	17	707	·23	·38	·079	·063
George	..	19	979	·070	·080	·050	·19
Knysna	..	13	810	10	·035	·041	·21
Uniondale	..	12	1,690	·057	·099	·064	·14
Oudtshoorn	..	19	1,653	69	·15	091	·13
Worcester	..	30	2,623	16	·093	·066	·11
Ladismith		16	1,256	·19	·19	·087	·11
Paarl	.	23	610	030	·041	·045	10
Komgha	..	27	546	·13	·061	027	·18
Cathcart	..	28	995	·17	·11	·042	·10
Queenstown	..	4	1,749	·28	·17	·033	·099
Butterworth		8	311	·11	·088	.028	·17
Willowvale	..	4	..	·041	·159	·045	·16
St. Mark's	..	4	471	·063	081	024	·096

Thus 442 samples in all were analysed, collected from an area of about 27,000 square miles, in other words from one tenth of the entire Cape Colony, in the proportion of about one sample per sixty square miles. Not a very thorough examination, some may say. No, but from first to last, including the minutest details, it represents one man's work for about four years, during which time there have, moreover, been various interruptions.

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* C G.H. Senior Analyst's Report for 1892, p. 6.

The methods used for determining the available constituents of the soil have been fully described in a paper read by me before the South African Philosophical Society,* in November, 1900. By these methods the results shewn in the foregoing table were obtained.

It would probably not be an exaggeration to say that the soils of eight Divisions are on an average poor in lime, that those of two Divisions are poor in potash, and those of thirteen poor in phosphates. Of all the 442 soils, only 29 yielded lime in greater proportion than ·5 per cent., while in 259 the percentage of lime fell below ·25 per cent. It is noteworthy that the only district where the average amount of lime is satisfactory is the division of Oudtshoorn, so well known as one of the most fertile portions of the Colony. It should also be noted that in this same Division the average percentage of phosphoric oxide is higher than in any other of the Divisions visited.

FERTILITY OF HILLOCKS.

In many parts of the Colony my attention has been directed to slight elevations of the ground, not more than four feet in height, and twenty or more yards across. It has long been a popular tradition that the soil of such hillocks is particularly rich, and I have been assured that cereals of all kinds grow luxuriantly upon them, even where the lower ground may be poor and produce scanty crops. I have been told that it is not the usual practice to manure those hillocks, and that there are some farms where wheat has been cultivated for nearly a century without the hillocks receiving any manure or becoming exhausted. Time and opportunity have been lacking to devote special attention to this curious feature, but, while engaged in the general collection of soil samples, occasion has been taken once or twice to select a few from such localities. In such cases samples have been taken from the elevated ground and from the lower level near by. The following results were thus obtained; A, B, C, and D are hillocks soils from the Malmesbury Division, while A′, B′, C′, and D′ were taken from the lower ground corresponding to these; E and E′ are similar soils from the Paarl. Division:—

No	Water	Organic Matter.	Lime.	Potash.	Phosphoric Oxide.	Nitrogen.
A	1 574	5 834	146	121	·061	175
B	1·146	3·182	072	075	·072	·189
C	1 472	5·012	096	·095	·073	126
D	1·033	4·439	·147	·059	·041	·089
E	·76	5 57	064	171	·074	·006
Average ..	1·197	4 817	·105	·104	·064	117

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* Trans. S.A. Phil. Soc., vol. xi., pp. 125 to 160.

No.	Water	Organic Matter.	Lime	Potash	Phosphoric Oxide.	Nitrogen.
A'	1 010	4·332	014	114	·049	119
B'	1 092	2 640	014	045	028	112
C'	1·278	4 296	·014	095	055	119
D'	294	2·157	062	064	022	·072
E'	76	5 11	037	084	077	·003
Average ..	887	3 707	028	080	046	085

It is said that in some cases levelling down of the hillocks has resulted in an all-round increase of fertility: this does not appear improbable, especially on farms where these elevations are numerous.

I may say that in some quarters not only the existence of the hillocks but their fertility as well is ascribed to ants, beetles, and other insects.

INFLUENCE OF GEOLOGICAL FORMATION ON OVERLYING SOIL.

As far as our investigations into the composition of the soils of the Colony have proceeded, they have revealed the necessity for caution in assuming too readily that the fertility of a soil depends altogether upon the underlying rock. It is true that where some constituent—as, for instance, lime in the case of the Malmesbury beds—is deficient, that constituent will, in all probability, be wanting in the overlying soil, but the converse is not necessarily true, that the soils above geological formations wherein potash, lime and phosphoric oxide abound, will on that account be well supplied with these constituents in a form available for plants. Professor Hahn, several years ago, analysed a series of 21 granitic soils from the Cape Peninsula and neighbouring divisions.* Twenty of these were primary soils and contained, on an average

Lime	·037 per cent.
Potash... ...	·025 „ „
Phosphoric oxide ...	·014 „ „

One was an alluvial granitic soil, and yielded

Lime	·281 per cent.
Potash... ...	·151 „ „
Phosphoric oxide ...	·172 „ „

Incomplete disintegration was the cause of the poverty of the primary soils. In one case there was no available lime, the felspar having remained undecomposed. The vines on this soil were in a sickly condition, and no wonder!

The 442 soils already referred to are of the most part primary, overlying metamorphic slates, sandstones, and intrusive granite: they are generally poor in lime, their phosphoric oxide is low, and the only constituent which they contain in fair amount is potash. Hence it would pay best to use such soils for the cultivation of crops which require chiefly potash; potatoes, for instance, the vine, and cereals. The leguminous plants, clover, lucerne, and tobacco, cannot find in such soils the lime they need for luxuriant growth, and, on this account, the fertile Oudtshoorn district is far better suited for the cultivation of the latter. The apple, too, needing, as it does, of all fruit trees the most lime, thrives best where that plant food constituent is most abundant, hence the healthy apple orchards of the Worcester, Robertson, and Ladismith Divisions.

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*C.G.H. Report, Vine Diseases Commission, 1881

It is an excellent thing that there are many amongst the Cape farmers who devote a great deal of energy to the destruction of insect pests and fungi in their orchards, and who strenuously combat the ravages of rust among their cereals: if, however, they do this and neglect the condition of the soil, they resemble a physician who treats the symptoms in his patient and ignores the disease.

LIME AND PLANT DISEASES.

Now, apple trees standing on a soil poor in lime are naturally the less able to resist the attacks of insects and fungi, and wheat, sown on lands lacking a sufficiency of phosphates, is all the more prone to the attacks of rust. Far too little attention has been bestowed upon the chemical aspect of these matters; in fact, without direct investigation we have no means of knowing to how large an extent such cases may be affected by chemical considerations. We rightly spend time and labour on the cultivation of so-called rust-resistant grain, but we are indifferent to that which would largely obviate such care and attention, namely, the study of the proper requirements of the soil. Why are some *localities* rust-resistant and others not? The question is worth some research. Several years ago, when the *Ersysiphe graminis* appeared in the wheat fields near Durbanville, five samples of soil from the infected area were analysed, and shewed progressive exhaustion of the soil to the following extent:—

	Average composition per cent of Virgin soils.	Cultivated soils.
Lime	·291	·194
Potash	·133	·127
Phosphoric oxide ...	·031	·015

33 per cent. of the small quantity of lime originally present in the soil had gone, and 51 per cent. of the phosphoric oxide. Let us not spend ourselves altogether in fighting symptoms while we leave the disease to sap the constitution.

INFLUENCE OF CLIMATE ON PLANTS.

The difference between the climate of Europe and that of this Colony is so manifest that it is impossible to do otherwise than recognise the fact that so great a difference must exert its influence upon the nutrition of plants and of animals. On account of this difference, researches into the composition of plants used as fodder in Europe do not serve any practical purpose in South Africa beyond forming a standard of comparison by means of which we may estimate the value of our own stock food plants.

Turning to the indigenous fodder bushes and stock food plants of the country, and especially of the Karroo, where they form the staple means of sustenance for sheep, one important fact to remember is that the flocks have to depend upon this source of supply not only for solid nutriment, but also for water, where that commodity is scarce. The rainfall may range from six inches per annum upwards, or a drought may last for two or three years. The plants then derive most of their moisture from dew, and the feeding of stock upon European principles becomes an impossibility. And yet the sheep thrive, and thrive well, in the Karroo. The principal pasturage for sheep in the central districts of the Colony is *Pentzia virgata* *: of this important little plant Dr. Marloth rightly says that, but for it, sheep breeding would be next to impossible in the region mentioned †.

With respect to this and other Karroo plants, I cannot do more here than tabulate some of the results obtained by analysis, showing the percentage composition of certain of them :—

FRESH PLANT.

	Diplopappus filifolius.	Augea capensis	Atriplex halimus.	Mesembrianthemum spinosum	Caroxylon salsola		Pentzia virgata.
					var 1.	var. 2	
Water ..	24·43	94·44	82·78	82·31	77·49	35·85	26·64
Proteids ..	1·87	29	82	1·18	·79	3·46	1·79
Ash	8·11	2·81	4·18	3·36	5·45	7·65	12·82
Fibre ..	12·85	·34	1·31	2·56	6·60	8·90	9·50
Digestible carbohydrates (diff.)	52·74	2·12	11·11	10·56	9·67	44·14	49·25

AIR-DRIED PLANT.

Water ..	7·21	14·98	9·22	12·31	6·05	6·88	8·13
Proteids ..	2·30	4·57	4·33	5·88	3·29	5·02	2·24
Ash ..	9·96	42·94	22·02	16·68	22·75	11·10	16·06
Fibre ..	15·78	5·07	6·90	12·71	27·55	12·92	11·90
Digestible carbohydrates (diff.)	64·75	32·44	57·53	53·62	40·36	64·08	61·67

Of course, as these figures are founded upon investigations which cannot be regarded otherwise than as far from complete, they may have to be modified when the fuller research for which I plead has resulted in the performance of many more analyses.

Analyses have also been made of Colonial grown Tagasaste and Lucerne with the following results :—

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* Edmonds & Marloth : Elementary Botany for South Africa, p. 154.

† Ibid, p. 191.

	Tagasaste (air-dried).		Lucerne (air dried).		
	Leaf.	Stalk.	Leaf.	Stalk.	Wood.
Water ..	11·20	10·26	9·82	9·92	10 07
Proteids .	25·20	9·66	19·43	8·05	3·99
Nitrogen free extract ..	46·13	40·39	54·67	50·03	49·42
Fibre	9·14	32·56	11·97	28·50	33·77
Ash	8·33	·7·13	4·11	3·50	2·75

The *Euphorbia Caput Medusæ* would form a very succulent and nutritious cattle food if means could be devised for ridding it of the resinous matter which seems to obviate its use. Whether the resin is poisonous is a point that also requires elucidation, but if the plant were sliced and boiled, the danger from this source would probably be removed. The averages of three analyses in each case yielded the following results :—

	Older portions.	Younger portions.
Water	85·51	91 36
Proteids	2·62	2·51
Ash	2·21	1·07
Fibre	3 66	1 26
Ether Extract	1·80	78
Digestible carbohydrates	4·18	3 06

UTILIZATION OF PESTS.

The pioneer farmer needs to be a man of resource, capable of turning even the natural pests of the country to good account. Thus it is that the possible utilisation of the *Euphorbiaceæ*—and I may specially mention also the Prickly Pear—has occupied the mind of the farmer so continuously that it was thought worth while considering the adaptability of the latter for feeding pigs; the idea being to pass the plant through a mill with a view to mixing it with pumpkins, mangolds and fodders. Hence a series of analyses was undertaken which resulted as follows :—

	Stems.	Pith.	Older Leaves.	Younger leaves.
Water	88·95	93·23	92·01	93·13
Proteids	·29	·30	·42	45
Nitrogen free extract .	5·87	4·86	4·36	4 17
Fibre	3·83	·77	1·88	·83
Ash	1·06	·82	1·33	1·42
Tannin	·24	·22	·13	·13

It may be said that pigs show a great liking for the prickly pear when boiled for some hours with meat or kitchen refuse, and a fear which had been expressed that the presence of tannin would interfere with its use for this purpose does not seem to have been realised.

Farmers have been greatly exercised, especially in the Eastern Province of the Colony, as to the best possible methods of extirpating another formidable enemy in that region; namely, the locust. Some investigations performed in the Laboratory at Grahamstown have shewn that locusts dried in the sun have all the chemical characteristics of a nutritious food, and practical application of the analytical results to the feeding of poultry appears likely not only to create a demand for dried locusts, at a remunerative price, but will also give a considerable impetus to poultry farming in that part of the country.

TANNIN DETERMINATIONS.

In addition to the Prickly Pear, determinations of tannin have also been made in several other vegetable products, which may possibly, for this reason, be turned to good account. In the following barks from the Knysna forests, collected by me personally some years ago, the percentages of tannin were determined :—

Myrsine melanopleos (Cape Beech)	15·96
Gonioma kamassi (Cape Box)	3·83
Curtisea faginea (Assegaai)	2·98
Eckebergia Capensis (Cape Ash)	7·23
Nuxia Floribunda (Wild Elder)	5·71
Euclea undulata (Quar)	3·26
Royena lucida (Black Bark)	4·67
Cunonia Capensis (Red Alder)	8·40
Oreodaphne bullata (Stinkwood)	5·67
Ochna arborea (Redwood)	8·21
Platylophus trifoliatus (White Alder)	6·08
Podocarpus latifolius (Upright Yellowwood)	2·65
Pterocelastrus rostratus (White Pear)	2·09
Vepris lanceolata (Ironwood)	2·01
Podocarpus elongatus (Outeniqua Yellowwood)	2·88
Elœodendron croceum (Saffronwood)	1·92
Pterocelastrus variabilis (Candlewood)	5·11

The folowing estimations were made in other Colonial grown trees :—

	Bark.	Twigs and Leaves.
Acacia cyclopis	6·50	
„ *saligna* (three localities)	19·12 to 22·92	
„ *pycnantha* „ „	18·25 „ 26·04	
Elœodendron croceum	14·20	3·25
Curtisia faginea (two localities)	12·90 to 14·05	4·00
Taaibosch	10·15	7·98
Veld taaibosch	7·05	4·95
Pterocelastrus variabilis	6·13	
Oreodaphne bullata	3·15	

In addition to the above, determinations of tannin have been made in the following:—

Rumex tordatus (leaf and calyx lobes) ...	1·42	per cent.
„ „ (stalk)	·26	„
„ „ (rhizome)	10 93	„
'Ntolwane tuber from Transkei... ..	14·36	„

It may be of interest to record here the results of attempts to increase the percentage of tannin by slitting the bark of *Acacia pycnantha*; these experiments resulted as follows:—

Bark on slit side, including *new bark* in slits ...	30·4	per cent.
„ from side *opposite* to slits	20·9	„
„ „ top of tree *above* slits	34 4	„
„ „ unslit trees	26 4	„

Sugar Beets and Lack of Lime.

When referring to the composition of Colonial soils the deficiency of lime was remarked on; generally speaking, the soil of many districts is proportionately better supplied with potash than with any other plant food constituent. Under these circumstances, recognising the fact that, as European experiments have shewn, sugar beet yields much more sugar in a potash than in a lime soil, it becomes a matter for experimental investigation whether crops of sugar beet cannot be grown profitably in places where the want of lime is an obstacle to successful fruit culture. Analyses of sugar beets cultivated in Sterkstroom district shewed the largest tubers to contain an average of 15 98 and the smaller an average of 17·80 per cent. of cane sugar: these results compare favourably with those of experiments performed in the United States, in Victoria, and in Germany, where the sugar ranges from 12 to 17 per cent.

Grafted Vines and Soil Exhaustion

Another point which could be made the subject of some research is connected with the reconstitution of the vineyards of the Colony by grafting Cape vines on American stocks. It has been noticed that, under such conditions, the Cape Vines become more luxuriant, and bear more richly than they did before the introduction of the American vine. A fundamental reason for the increased vitality may be found in the more extensive root system of the American vine, whereby the nutrition of the plant is materially augmented. But the very cause which operates thus favourably upon the vine tends to accelerate soil exhaustion. It would therefore be highly interesting if a series of investigations were undertaken to ascertain the rate of increase of potash, lime and phosphoric oxide in the leaves of various classes of vines.

Influence of Climate on Animals.

Reference has been made to the effect of the Cape climate upon vegetable produce, but the animal system is naturally also subject to climatic influences. This action, as can easily be understood, is not only direct, but also indirect—the effect of climate upon the fodder is certain in turn to be manifested in the stock that feed upon the latter, and, apart from that, the method of feeding cattle here is very different from what it is in England. Problems bearing on this question have arisen on more than one occasion, and one of the subjects hitherto entirely unexplored is the effect of our climate upon the milk, poor in fat, of cows imported from Holland. Neither has there been any investigation into the result of cross-breeding Dutch and Cape cattle, as far as the milk produced is concerned. The first of these two points formed the subject of a few experiments carried out in the Government Laboratory some years ago. I cannot now occupy time and space by enumerating all the analytical results obtained,* but just a few conclusions may be mentioned. It was noticed that acclimatisation brought about a tendency to produce less—though richer—milk. In the herd under observation there were seven imported Friesland cows, and ten of pure Frisian breed, but born in this Colony: the average composition of the morning milk of these two classes of cattle is subjoined:—

	Imported.	Colonial born.
Specific gravity	1·0309	1·0324
Total solids	11 03	11·94
Fat	2·63	3·06
Solids not fat	8 40	8 88
Water	88·97	88·06

PLANT DRUGS AND POISONS

I would now, for a few moments, turn to the subject of the indigenous plant poisons and potential drugs of this country. There is urgent need of research in this direction. Investigations undertaken solely with a view to determine the guilt of persons indicted for murder or culpable homicide scarcely merit the name of chemical research, and yet such chemico-legal enquiries form the entire present extent—from a chemical aspect—of the "research" whose need Pappe pointed out half a century ago.

It seems scarcely credible that, although hundreds of lives have been lost in this country, through the agency of poisonous plants since Pappe's enumeration was published, the only printed record of any chemical investigation performed in connection with these subjects, should be confined to one short communication; namely Mr. Meiring's note on the active principle of *Mesembrianthemum tortuosum*, L., published, in 1896, amongst the transactions of the South African Philosophical Society.† A few months ago I communicated to the same Society some details of such investigations as had been performed in the Government Laboratories in connection with poisoning cases amongst the aboriginal natives.‡ These details I need not repeat here. I may nevertheless indicate some of the principal points brought forward.

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* C.G.H. Senior Analyst's Report for 1904, pp. 15 to 20.

† Trans. S.A. Phil. Soc., vol. ix. pp. 48 to 50.

‡ Ibid., vol. xvi. 26th April, 1905.

There had been no exhaustive examination of the plants discussed, nor had anything more been done than was absolutely needed to elucidate the points required to be made clear for legal cases. Subject to this restriction the plants mentioned below had—amongst others—been examined.

From *Trichilia Dregei*, E. Mayer, which was said to have caused the death of a Kafir woman, slender needle shaped crystals, not of an alkaloidal nature, were obtained. *Mesembrianthemum tortuosum*, L., appeared to contain an essential oil possessing a peppermint-like odour. The plant was apparently soporific, caused dilation of the pupil of the eye, lessening at the same time its sensibility. Fairly exhaustive tests were applied to needle shaped crystals which were found to constitute one fifth per cent. of the bark of the "Umjela" or Quinine tree, (*Tabernæmontana ventricosa*, Hochst.) This tree is said to possess therapeutic properties of the same nature as those of quinine. The active principle was not quinine nor any other alkaloid of the cinchona group, but appeared to be an as yet undescribed alkaloid, crystallising in needles from a chloroform extract. With concentrated sulphuric acid these crystals developed a faint vermilion colour; Frohde's reagent produced a dark blue changing into green, and Vitali's test, which is very delicate, yielded a fine crimson lake. The tree attains a height of fifty feet in the Transkeian forests, with a diameter of four feet, and its abundance should render the drug procurable in large quantities, if it prove to be commercially valuable.

An uncrystallisable principle, probably an alkaloid, was obtained from the bulb of *Buphane toxicaria*, Herb., which was the cause of death of two Kafir women. The bulb contained about two fifths per cent. of this alkaloid, which resembles brucine in its physiological effects, but differs therefrom in chemical reactions.

Several examinations have been made of *Acocanthera venenata*, Don., chemical and physiological. The plant is highly poisonous, arresting the heart in systole, but may possibly serve as a valuable drug if the action were subject to proper control. The active principle is evidently an uncrystallisable glucoside; for the presence of this the most characteristic test appears to be concentrated sulphuric acid, which produces at first a yellow colour, changing into pink, then becoming brick red, and finally a clear violet.

An acrid resin, acting as a powerful depressant, was obtained from the dried root of *Polygonum tomentosum*, var. *glabrum*, which contained 2½ per cent. of the resin. With sulphuric acid it produced a pink colour, changing, through cherry red and deep lake, to a dirty brown, and then fading to a greenish tint.

A poisonous plant of extremely common occurrence in various parts of the Colony is *Ornithogalum thyrsoides*, which is frequently found accidentally mixed with forage, and has thus been the cause of death to horses on more than one occasion. A recent Government Notice, warning farmers of the poisonous character of this plant, was the direct result of enquiry by a Select Committee of Parliament. In the report of this Committee it is stated that "further evidence is necessary to establish the fact that this plant is injurious in all stages of its growth." Physiological investigations made by the Chief Veterinary Surgeon have proved its poisonous nature, but there has been no chemical examination directed towards the isolation of the poison, whatever it may be.

Unless the study of this and other active principles be made a matter of definite and sympathetic research, the probability is that the present patchwork process of obtaining information with regard to them will drag on for years. It is highly regrettable that so important a study as the poisonous and medicinal plants of this Colony should remain a mere side issue of the Law Courts. Organised research in the direction indicated would be of great advantage, even in criminal proceedings; it needs scarcely to be emphasised that definite evidence with respect to poison found in human organs submitted for analysis would be far more satisfactory than the vague information that is, at present, but too often all one has to go upon.

One hesitates to conjecture what possibilities may open to the chemical investigation of South African plants and plant products; not only alkaloids and glucosides, but oils, resins, and compounds of the aromatic series in abundance await discovery and practical employment.

CAPE FISHES.

In the fishing grounds around the coasts of this Colony we have as yet the embryo of what may at some future time develop into a vast industry. From a chemical point of view it would be of the highest interest to learn something regarding the comparative nutritive value of Cape fishes. All that is at present known about the composition of fish is gleaned from investigations performed elsewhere; our own fields lie unexplored.

At my suggestion the Government Marine Biologist supplied me with specimens of six of the best known edible fishes for analysis. The fish was in each case immediately cleaned, weighed, and analysed, and the following results were thus obtained —

	Percentage in whole fish			Percentage in fresh flesh			
Name of Fish	Weight of fish in grammes	Offal, bones, &c	Edible part (flesh)	Water	Fat.	Proteids	Ash.
Cape Mackerel (*Scomber coleus*)	1,848	35·1	64·9	71·46	11·77	15·79	0·98
Galleon (*Dipterodon capensis*)	1,945	43·1	56·9	66·62	13·20	18·30	1·88
Stockfish (*Gadus Merlucius*	4,878	55·3	44·7	81·24	0·59	16·87	1·30
Kabeljauw (*Sciæna Hololepidota* .	6,355	48·9	51·1	74·97	5·09	18·48	1·46
Harder (*Mugil capensis*)	270	55·6	46·4	73·79	4·05	20·62	1·54
Maasbanker (*Caranx trachurus*)	245	42·6	57·4	72·59	6·88	19·19	1·34

A small specimen of the oil obtained from the snoek (*Thyrsites Atun*) was examined, in order to ascertain its adaptability for lubricating purposes, with the following results:—

Viscosity (Water = 25)	114 at 60 F.
	80 at 70 F.
	66 at 80 F.
	50 at 100 F.
	43 at 130 F.
Solidifying point ...	—1 C.
Melting point ...	2·5 C.
Flash point	297 C.
Volatility in 24 hours at 100 C	1·6 per cent.
Free fatty acids, calculated as Oleic Acid ...	7·8 per cent.

The viscosity of the oil appears even less than that of sperm oil, and its change of viscosity is not so great as is the case with some other lubricating oils, which is of advantage, for instance in connection with engine cylinders; on account of its low viscosity it may perhaps, be less suitable for heavy work. The oil thickens considerably during twenty-four hours' exposure, and, as far as its liability to gum is concerned, appears about equal to rape oil. No doubt some useful employment may be found for this or other fish oils, but here again exhaustive investigation is needed—the few tentative experiments made, although they seem to shew that this oil would be suited for light work at low temperatures, are, in themselves, far from adequate demonstration.

MINERAL CHEMISTRY.

In the realm of mineral chemistry there is as much scope for research as in relation to the animal and vegetable kingdoms. Potential sources of industry and wealth, no doubt, lie concealed, in many cases, under our very feet. Take, for instance, the subject of earthenware: at King William's Town there are clays of various kinds, some of them may possibly be turned to account. Of those whose analyses are tabulated below, No. 1 compares well with the best fire clays, Stourbridge, for example; It is compact, with a slightly foliated texture, very fine in grain, and greasy to the touch. On tempering, it forms a tenacious paste, which, when dried, and strongly heated, proves very infusible. No. 2 is an ironstone of the nature of Lenticular Hæmatite, very uniform in composition and capable of being ground down to a fine cherry red powder: there seems to be no reason why it should not make as good an article as the Torbay paints which are produced from a brown hæmatite containing 50 to 65 per cent. of oxide of iron; the remainder, as in this case, being siliceous matter. A superior article, containing only 28 per cent. of silica, was subsequently found at the same locality. No. 3 was a Kaolin from Oatlands, resembling the Cornwall "China

Clays." On account of the small percentage of iron it would, no doubt, serve for furnaces and fire-bricks, while pottery of various shades could be produced by mixing it with red clay. Here too, organised research is necessary, for practical tests should go hand in hand with chemical experiment. Nos. 4, 5, and 6 appear to have the making of good refractory fire clays: they were found at East London, Cyphergat, and the Cape Collieries respectively. Nos. 7 and 8 are two fire clays from Molteno, and Nos. 9 and 10 are kaolins or China clays from George. No. 11 is an analysis of Dowlais and No. 12 of Stourbridge clay.

	1	2	3	4	5	6
Moisture	3 39	1 48	1 36	—	4 85	6 03
Combined water and volatile matter	4 42	—	11 35	—	6 14	6 60
Quartz, sand, &c ..	20 33	63 59	53 13	67 38	65 37	65·53
Silica, free and combined ..	41 85					
Alumina	27·47	trace	31 10	9 47	15 98	11 70
Oxide of Iron .. .	73	32 55	1 65	11 10	4 65	3 42
Lime	91	14	—	1 18	24	38
Magnesia	1·01	45	trace	—	34	50
Alkalies . ..	trace	1 38	trace	—	1 31	1 51

	7	8	9	10	11	12
Moisture	3 90	3 45	2 4	2 3	6 21	10·30
Combined water and volatile matter	8 70	6 11	—	—	1 30	
Quartz, sand, &c ..	23 16	57 96	22 4	17·1	67 12	63 30
Silica, free and combined ..	34·55					
Alumina	25·93	29·51	73 6	74 4	21 18	23 30
Oxide of Iron	3·26	1·96	trace	trace	1 85	1 80
Lime	16	28	trace	trace	32	73
Magnesia	50	53	trace	trace	84	—
Alkalies	1 06	49	small quantity	small quantity	2 02	—

Some years ago a bituminous mineral was brought from the Knysna Division and examined in the Government Laboratory in Cape Town. It yielded a heavy oil, burnt with a luminous flame, emitting an empyreumatic odour. The oil referred to distilled off at 130°C. 62·08 per cent. of the substance was volatile, and it left 1·15 per cent. of ash. It dissolved readily in ether, chloroform and spirits of turpentine, but most freely in carbon disulphide.

From Mohesh's Ford, Barkly East, pieces of limestone, containing a black bituminous substance, were procured; from these likewise mineral pitch was distilled. I understand that there are large quantities of this substance, which is evidently natural asphalt, and in warm weather it is reported to assume a liquid form.

Just at this point may be mentioned a matter of some interest which as far as I know, still awaits research. In the Carnarvon

Division there are said to be found quartz crystals containing cavities partly filled with oil. The nature and composition has not yet been ascertained. To collect a sufficient quantity and subject it to chemical examination may be no easy matter, but doubtless interesting results would be forthcoming if this were done.

A very peculiar occurrence of free chlorine in some specimens of efflorescent salt from Bechuanaland is worth mentioning. The salt consisted chiefly of chlorides and carbonates of sodium and potassium, with a little sulphate and traces of magnesia. The presence of chlorine was apparently due to hypochlorites. Other cases of similar nature had been reported from the Calvinia Division and the Orange River Colony.

MINERAL AND BOILER WATERS.

Time and space would fail were any adequate reference made to the numerous mineral springs of the Colony, thermal, saline, chalybeate, and sulphur springs, all of which are represented in various parts of the land. Scarcely any of them have been properly investigated.

For the railway service of the Cape Government the water question is one of enormous moment. While journeying on official duties a year or two ago, no less than six locomotive engines were disabled, during the course of a single week, on the portion of the railway line between Graaff Reinet and Nobelsfontein, the cause of this being in each case the quality of the water. How frequent such occurrences are I have no means of saying, but the loss to Government, direct and indirect, must be immense. Here is an important matter for research. The conditions under which trains are run in this Colony are vastly different from those existing elsewhere: the authorities of an English railway company would probably refuse to employ many a water which, owing to the impossibility of obtaining anything better, is in daily use here.

The want of definite standards of comparison is sorely felt. New sources of supply are constantly being opened up, in each case involving an analysis and an expression of opinion from the analyst. Owing to the local conditions, to which allusion has already been made, the ordinary difficulties of expressing such an opinion—difficulties which must appeal to everyone who has studied the subject—are greatly increased.

Hence any expression of opinion given by the analyst should be based on South African standards, laid down as the result of experiments on the working of a number of waters of known composition.

There is a vast field, far beyond what has been touched on by me, awaiting research. More than one who had entered upon such an exploration with hopeful expectancy has become trammelled, and consequently dispirited. Even those who are not chemists must see the advantage of enquiring closely into some of the points here suggested: let those be found whom we can fully trust to pursue such enquiries, and then, over and above ordinary routine work, let them be furnished with means to carry on at least some of these investigations, not as side issues to other routine duties, but expressly set aside for such investigations and nothing else. Above all the study of the soil and of the medicinal flora should on no account be suffered to lapse. Each of these two subjects should form sufficient matter fully to occupy at least one chemist: in addition there is enough chemical research work ready to hand to need all the time of a third investigator. Hence, without three persons wholly occupied in research of the nature here delineated, the interests of this country will not receive due attention, and in those interests I earnestly urge the need of a better organisation for carrying on chemical research in matters pertaining to this Colony.

PREVENTIVE INOCULATION FOR REDWATER.

By J. A. Robinson, M.R.C.V.S.

In dealing with inoculation for Redwater and with any other points of the disease which may be incidentally touched upon, I do not wish to be taken as dealing with Redwater as it occurs in various parts of the world, but to place on record my experiences and conclusions in treating it in the South Western districts of the Colony. I need not describe the symptoms and general appearances of Redwater which are well known to all interested in the disease, or attempt to deal with its pathology, about which—although a great deal has been written and much information gained—there are many points which are still somewhat obscure, the further investigation of which would prove both interesting and instructive.

Redwater is due to the introduction into the animal's system though the medium of ticks of an organism (*Piroplasma bigeminum*) which locates itself in and breaks up the red blood corpuscles. In cases which recover, the organism, being of the malarial type, remains in the system and undergoing various changes of form gradually loses its vitality, and consequently its power of conveying the disease to other animals, until, unless reinfection takes place, it disappears altogether in from 15 months to 2 years.

It is upon these facts that the present system of preventive inoculation is based, as it was found by early experiments that although the blood of cattle recently recovered from Redwater when injected into a susceptible animal gave a severe attack of the disease and often resulted in death, yet the virulence of the blood decreased in inverse proportion to the length of time the animal from which it had been taken had recovered, and that the blood of cattle three months or longer after recovery, produced only slight symptoms of illness, conferred immunity and entailed very small risk of loss.

To the article on Redwater by Messrs. Hunt and Pound of Queensland published in the *Agricultural Journal* No 6, vol XIII, I am indebted for very valuable information both as to the disease itself and its prevention by inoculation. Redwater as described by these authors is identical with the type of disease which has come under my notice, which varies in important respects from that described as existing in the United States of America and the Argentine.

Inoculation can be carried out by means of :—

1. Blood of cattle which have recovered from a natural attack of Redwater.
2. Blood of cattle which have been inoculated.
3. Blood of cattle which have been bred and reared on Redwater veld and have acquired immunity without shewing any appearance of disease.

The first system is the only one which can be followed when Redwater appears in an entirely new district as it did in Knysna in 1898, and it was carried out with general success, but with some few unfortunate accidents, for three years. Between the use of the blood of cattle naturally recovered and those inoculated there is little difference. The chief variation being that the blood of an inoculated animal which has given a fever reaction without symptoms of constitutional disturbance may be used as soon as the temperature has subsided, whilst the blood of an animal which has had an attack of Redwater is not safe to use for at least two months after recovery. The risk incurred in using the blood of recovered animals is due to the constitutional peculiarity of the individual, the virulence of the blood a few months after recovery bearing no relation to the severity of the attack through which the animal passed. In the early days of Redwater in these districts I have bled two cattle which had suffered from the disease apparently in equal degree, and whilst the blood of one might be all that could be desired, that of the other would perhaps result in severe reaction and consequent heavy loss. The chief disadvantage in using the blood of inoculated or recovered cattle is that in them the organism appears to be unstable and varying in its character, and an ox of this class bled three times at consecutive intervals of nine months will usually give a different result on each occasion.

Although the general results of inoculation by the first two methods were good and saved the lives of a very large number of cattle, yet the uncertainty of the strength of the reaction from the causes just mentioned, induced me in 1901 to attempt the use of the blood of young cattle bred on Redwater veld and which had never been noticeably sick. This system has proved very satisfactory, and has been adhered to for the last four years, by it I have personally inoculated over 5,000 cattle with an average loss of under 2 per cent. All calves on Redwater farms are infected during the first few months of their lives and are of course subject to repeated infection afterwards as long as they remain in the same area, and under these conditions the organism in their blood seems to maintain a more stable and definite character than in cattle naturally affected, or inoculated after they have reached the adult stage. In first commencing inoculation by this method, young cattle were used because no others were available, but I have since found that the blood of full grown animals of the same type gives equally good results.

Cattle selected for bleeding should be in bright healthy condition and blood should not be taken oftener than at intervals of fourteen days, as too frequent bleeding by lowering the vitality of the animal increases the virulence of the Redwater organism in his blood, and consequently unfavourable results follow its use for inoculation.

The same effect is induced by driving cattle hurriedly from place to place, and therefore care must always be taken that the animals from which blood is to be abstracted are well fed and looked after. If there is any doubt as to the fitness of a subject to furnish blood for inoculation his temperature should be taken and no animal used which registers over 101°F. The safest method is to take the temperature in every case before bleeding. There is in some districts a prejudice against the use of the blood of cows or heifers for inoculation, but this is without rational foundation, as where unfavourable results have followed the use of the blood of heifers, this has been due not to sex but to alteration in the vitality or virulence of the Redwater organism from the causes above referred to. Blood may be obtained by the usual farmer's method of opening the jugular vein with a fleam or sharp knife, and allowing it to flow into a receptacle for that purpose; when only a small quantity of blood is required, the best way is to place a riem round the animal's neck in the standing position, and to insert the needle of the hypodermic syringe into the vein thus raised. The cleanest method of bleeding is by making an incision through the skin and then opening the vein with a canula to which an india-rubber tube is attached leading to a bottle or basin. But this is one which requires some amount of practice, as the vein is liable to injury if the operation is not carried out carefully.

When the blood has been withdrawn, coagulation may be prevented by whipping or stirring briskly for a few minutes, and removing the fibrin or thick portion of the blood which then forms, or a better way is to place in the receptacle in which the blood is caught, a little Citrate of Potash dissolved in water. A teaspoonful of Citrate of Potash dissolved in a wine glassful of clean water will keep a bottle of blood fluid, and does not in any way interfere with its action or results.

To carry out inoculation a hypodermic syringe is required, and I have found the 10 c.c. syringes sold by Mayer and Meltzer, Cape Town the most satisfactory and reliable, as they are a handy size for use, strong and easily kept clean. The dose of blood to be given is 2 c.c. to 3 c.c. for each animal.

To secure an ox for inoculation he must be fastened to a post alongside a wall or fence, a strong man then seizes the animal by the head, holding the right horn with his left hand and the nose with his right, another man then takes the tail and bringing it forward between the legs stands firmly against the right quarter; it is advisable to have two men at the after part of the animal. The operator then approaches and taking the loose skin behind the right shoulder between the thumb and fingers of his left hand introduces the needle of the syringe underneath the skin in a downward direction, the syringe containing 3 c.c. of blood is then inserted into the neck of the needle and its contents discharged and the needle withdrawn. A little friction should be applied over the site of inoculation. The whole operation from seizing to releasing the animal does not usually occupy more than a minute, and though occasionally an obstreperous ox which takes up a little time is met with, this is exceptional; one or two good men used to catching and handling oxen are very useful, and greatly facilitate matters.

To insure the desired result the blood should be used on the day it is taken, as more than twelve hours after withdrawal its efficacy cannot be relied on. On the other hand, I have sometimes used blood twenty-four hours' old with satisfactory results, but what I wish to convey is that the blood should always be used as fresh as possible, as its efficacy cannot be relied upon for longer than twelve hours unless it is specially prepared. I need hardly add that great care should be exercised in keeping clean all knives, syringes, or other instruments employed in inoculation.

Results of Inoculation.

In inoculating cattle by the method above described, the temperature usually rises on the fifteenth day following; the rise is sudden as a rule and is preceded by a drop of one or two degrees. The duration of the fever stage is very variable, continuing in some animals for six or seven days, whilst in others the temperature after a slight rise for a day or two, becomes normal. When the temperature of an inoculated beast is taken on the fifteenth morning it will usually be found to be 99° F. or even lower if the weather is cold; in the evening it will be from 103° F. to 106° F. The average degree of fever is from 105° F. in the evening falling to 103° F. or 104° F. in the morning and continuing for four or five days. I have known cases in which the first rise of temperature has been delayed to the seventeenth day, but this is exceptional and I have never been able to detect the secondary reaction mentioned by most writers on Redwater.

The dose of blood injected has some effect in regulating the date on which the temperature rises. I have inoculated cattle with doses varying from 1c.c. to 40c.c., and have found that with a very small dose the first rise does not occur until the seventeenth or eighteenth day, whilst with the larger doses it commences sooner than that, otherwise the dose seems to be immaterial provided the blood is of the desired moderate virulence. I have always noticed in inoculated cattle that the earlier the first rise of temperature, the more severe the fever through which they pass, and the consequent loss of life; therefore, whilst there is at present always a very slight element of risk owing to the quality of the blood used not being defined, and this risk is increased by giving a large dose, it is not advisable to incur it whilst a smaller one is equally effective in conferring immunity. In inoculating 100 cattle, 90 will usually pass through the fever stage without showing any constitutional disturbance beyond a little dulness, whilst the remainder will present appearances of Redwater in varying degrees, but the average loss is not more than 2 per cent. and under favourable conditions nil. It should be noted that in a herd of cattle, amongst the older animals, there are always some with chronic disease, or natural weakness of the liver or other digestive organ, and that this becomes accentuated by the febrile condition induced by inoculation, and may delay complete recovery for a little time; this particularly applies to milch cows.

It is very rare to find the clinical appearances of Redwater shewn by cattle under two years old, but from that age their susceptibility appears to gradually increase until they attain maturity. When an animal is full grown, his age seems to have no effect in varying the severity of the disease, which is then influenced by condition, food, and surroundings. This applies equally to inoculated cattle, and they do best when improving in condition and feeding on green soft veld, therefore the best season for inoculation along the coast is in the early summer months from September to November. Very poor cattle come through successfully, as long as they are moving in the right direction; and on the other hand some loss is usually experienced when inoculating fat cattle which are falling off in condition. Cattle should under no circumstances be inoculated on dry veld in the middle of summer, as the excessive heat at that time, combined with unsuitable feeding, is liable to produce undesired results. Inoculated cattle always do best when running on veld to which they are accustomed, as they then rest well, know the best places for feeding and water, and where to find shelter when necessary.

TREATMENT OF INOCULATED CATTLE.

Beyond placing them in the most favourable conditions, I do not recommend any general treatment for inoculated cattle, although the small percentage shewing severe symptoms, may require attention. The temperature is always a good guide to the condition of the animal, and when this does not rise beyond 105°F. no serious results need be anticipated. It should be noted that any excitement to a sick animal has the effect of raising his temperature one or two degrees, and that when it is necessary to move cattle they should be driven quietly and handled gently when caught for drenching.

When, in addition to the fever, there is constipation and loss of appetite, a bottle of Linseed oil may be given, combined in acute cases with from 20 to 30 drops of Croton oil, or a dram of Calomel. It is not advisable to repeat the purgative, and it should be followed by two dram doses of Sulphate of Quinine given twice a day in a little gruel until recovery takes place. Where the animal appears depressed and the bowels are acting naturally, the purgative may be omitted and the quinine given alone. The use of salts, either of soda or magnesia, is not to be recommended in Redwater, as they seem to have a very debilitating effect when given in sufficiently large doses to produce purgation. Where the patient ceases feeding a few bottles of gruel with a little brandy may be given with good effect, but in all cases where the temperature is not over 105° F. the bowels acting freely, and the animal feeding fairly well, it is best left to nature as the excitement of catching and drenching cattle, particularly oxen and untrained animals, has an effect which counteracts in a great degree any good done by the administration of medicine. Sick cattle should always be able to obtain shelter from extremes of heat or cold, and a little green forage when obtainable is very useful.

IMMUNITY FROM INOCULATION.

This is one of the most important points in connection with inoculation and it must be understood that the duration of immunity will vary with the character of the district in which it is carried out.

In the area extending from the Tzitzikama to the border of Mossel Bay the blue tick prevails everywhere in large numbers in the summer, and in some parts of it in the winter also, so that in that district it was most exceptional for an inoculated animal to get a relapse. In the western part of the George district most of the cattle were inoculated late in the summers of 1903 and 1904, and a few were unable to maintain immunity and died of Redwater in the summers following, but I am not aware of any cattle which were inoculated early in the summer that subsequently died of the disease. For this reason I would urge the operation at that time, as when all the cattle on a farm are inoculated then, the repeated development of ticks on them during the following season insures reinfection and strengthened immunity. In the more westerly districts where the tick plague is somewhat intermittent, varying with the rainfall during the summer months, it is hardly to be expected that the resistance to Redwater conferred by inoculation will be of the same permanent character, but as the reinoculation of cattle entails risk only to the few whose immunity has lapsed, it is advisable that it should be carried out at once if Redwater should reappear. The direct immunity conveyed by inoculation has an *average* length of at least nine months, as I have known coast cattle removed out of the tick areas soon after this operation, remain away for that period, and continue quite healthy on their return.

CONCLUSIONS.

Use the blood of an animal which has been bred and reared on Redwater veld, and which has shewn no constitutional appearances of the disease.

Inject a dose of from 2 c.c. to 3 c.c. and do not keep blood more than twelve hours.

Inoculate in the early spring when the veld is in good condition, see that inoculated cattle have shelter from extremes of heat and cold, and whilst they are in the fever stage allow them to remain as quiet as possible.

If any cattle shew a rise of temperature of over 105° with constipation, dulness and loss of appetite, give a bottle of Linseed oil with twenty drops of Croton oil followed by two drams of Sulphate of Quinine twice a day until convalescent.

The crucial time with inoculated cattle is from the 15th to the 19th or 20th day afterwards, and 28 days after inoculation they may be considered to have recovered from its effects. If there is an appearance of Redwater in an inoculated herd in the season following, reinoculation is advisable as it is imperative for those cattle which have lost their immunity and the immunity of the whole herd will be thereby strengthened.

I would impress upon all stock-owners, whose cattle are liable to become infected with Redwater, the advisability of inoculating them as soon as possible as the risk in the early summer is very slight, and if the operation is delayed until the herd becomes infected later in the season there is added to possible loss from inoculation, the loss of cattle from the actual disease, the most favourable period is passed over, and as there is a smaller chance of early reinfection, a less durable immunity is conferred.

THE CONSTITUTION OF AGRICULTURAL SOCIETIES IN CAPE COLONY.

BY DR. ERIC A. NOBBS

[This and a subsequent paper have been compiled from information gathered from many sources; probably therefore incomplete and perhaps inaccurate. It is requested that Secretaries or others will notify to the writer any omissions or changes which may from time to time occur, in order that the same may be rectified, and an accurate record of the state of our Agricultural Societies and Associations may be kept in the Department of Agriculture, and published from time to time as occasion arises.]

At the present time the subject of agricultural co-operation is receiving very widespread attention and is commonly regarded as a new idea at the Cape. The fact seems to be overlooked that there has long existed among us a systematic combination of farmers for mutual benefit. For many years past there have flourished side by side two separate organisations, state-aided, and supported by persons of all shades of political complexion, aiming at intellectual improvement rather than economic advantage.

It is true that the past history of these bodies, our Agricultural Societies and Farmers' Associations, has been somewhat chequered, but at the present time they are in a generally thriving condition. Being still in the growing stage of their development, there is naturally a lack of uniformity about them, and a want of cohesion, attributable to their wide distribution and independent origin, and to the extreme differences in the agricultural conditions in various parts of the Colony. A description of the nature and aims of this somewhat motley agglomeration of separate bodies may prove useful, showing their points of resemblance and divergence, and suggesting those in which they may advantageously copy one another, as well as errors to be avoided. To enable their influence to be more directly felt, and their work to be more effective, it is in the highest degree desirable that such bodies should be more closely connected with one another and be run on more similar lines. There has indeed been a tendency towards combination in the past, but there is room for still closer union. The general impression is that the differences between Farmers' Associations and Agricultural Societies lie in this, that the main object of the former is to encourage agriculture, in the widest sense of that misused word, by organising frequent meetings of farmers for lectures and discussion, and that their interests are focussed at an annual Farmers' Congress, whereas the chief aim of the Societies is the holding of Agricultural Shows, and that these bodies meet annually at an Agricultural Union.

So far this impression is justified, but at the same time it should be pointed out that several agricultural societies have a wider conception of their sphere of usefulness than is represented by the mere holding of an annual show, while others again are really identical in methods with the Farmers' Associations. The one really merges into the other, all gradations being met with, and it is to be regretted that so far they have not been able to join forces to attain such ends as both are agreed upon, especially since they are antagonistic in nothing.

It is proposed in the present paper to deal only with those organisations known as Agricultural Societies, postponing to a later date the discussion of Farmers' Associations and kindred bodies.

Certain Agricultural Societies exist only for the purpose of holding shows, lapsing into inactivity as soon as that annual event is over. Chief among these are such large and influential bodies as the Port Elizabeth and Worcester Agricultural Societies, also those at Caledon, Riversdale, Bredasdorp and Stellenbosch, while others of the same persuasion, not able within the last few years to arrange agricultural shows, are the Societies at Cradock, East London, King William's Town, Oudtshoorn, Richmond, and the one lately re-constituted at Malmesbury.

Elsewhere agricultural shows are run by Committees annually appointed at a public meeting, and these appear to serve the purpose admirably, and receive grants from Government just like real Societies. Shows were thus arranged last year at Barkly East, Ceres, Paarl, Robertson and elsewhere, but these are not Agricultural Societies in the strict sense, although they are also useful bodies and do a lot of good work.

Other Agricultural Societies again devote themselves not only to the holding of shows but also try to promote the interests of the farmers by holding wool and stock fairs, by arranging for public trials of implements, encouraging the establishment of public dipping-tanks, sending deputations to Government on agricultural matters, and losing no opportunity of forwarding the common interests of their members. Chief amongst these may be mentioned the Western Province and the Albany (Grahamstown) Agricultural Societies also those at Hay, Peddie and Umzimvubu. While active in other spheres of work, the three latter Societies have not of recent years held shows, and hence partake more of the nature of Farmers' Associations, though since their main object is the annual show, they are, as their names also imply, Agricultural Societies.

Yet a third group of Agricultural Societies exists, these make no effort to hold an annual show, but meet at definite dates for the discussion of matters of general interest. These resemble even more closely the Farmers' Associations and might properly bear that name. Such Societies are to be found at Darling (Malmesbury division), Groenberg (Wellington), Tulbagh and at Ugie (East Griqualand).

All the Societies above mentioned are more or less active. Unfortunately there are also a number which are in abeyance, and also several which have ceased to exist. Some are merely inactive as a consequence of prolonged drought following on war, and are likely to be resuscitated when prospects improve. Under this category fall Aliwal North, Cala, Cape Flats, Douglas, Hanover, Hopefield, Humansdorp, Jansenville, Lady Frere, Midland (Graff-Reinet), Peddie, Queenstown, Umtata and Wodehouse. Others again are unfortunately defunct, viz, Butterworth, Colesberg, Murraysburg, Victoria West and Willowmore, though in some cases these appear to have become changed into Farmers' Associations.

The accompanying list shows at a glance the numbers, strength and distribution of active Agricultural Societies, so far as it has been possible to collect information. The figures are of course subject to periodic alteration.

Name of Society.	Headquarters.	Members	Secretary
Albany	Grahamstown	210	M. B Walker.
Aliwal North	Aliwal North	67	J. J. McNally.
Barkly East	Barkly East	-	E V Cotterell.
Bredasdorp	Bredasdorp	90	J F Eksteen.
Caledon	Caledon	91	E. J. Baker.
Ceres	Ceres	— —	D. F Faure J S Marais.
Cradock	Cradock	123	S G N Webber.
Darling	Darling	48	F Versveld, Rheboksfontein.
East Griqualand	Kokstad	94	S Barton
East London	East London	105	G H Harvey, P O. Box, 281.
Glen Grey	Lady Frere	72	J Robertson Cumming
Groeneberg	Wellington	36	J P le Roux, Dreyersvlei
Hay Farmers' Society	Hay	38	T J. Carlisle, Glenthorn, Postmasburg.
Humansdorp	Humansdorp	—	W. W. Hermann, C C. Office
King William's Town	King William's Town	191	H Rushton, P O. Box, 86
Paarl	Paarl	—	C C A de Villiers
Peddie	Peddie	65	T W Brunett
Port Elizabeth	Port Elizabeth	125	D. M Brown, P O Box 187.
Richmond	Richmond	50	C W Paul
Riversdale	Riversdale	76	D Versfeld
Robertson and Montagu	Robertson	—	M. Nichol
Stellenbosch	Stellenbosch	160	J Smuts.
Tembuland	Umtata	25	C. C Henkel
Tulbagh	Tulbagh	24	J. C Lombard
Ugie Farmers' and Agricultural Society	Ugie, East Griqualand	26	R Drake, Cervantes
Upper Umzimvubu	New Amalfi, East Griqualand	62	A J. Davis, Sydenham, P.O. New Amalfi
Western Province	Cape Town	460	A. A Persse, Atkinson's Buildings, St George's Street, Cape Town
Worcester	Worcester	211	D. Bland

The Shows held by these Societies are familiar features of rural life, and require no special description here. Suffice it to say that they vary in scope and size from very humble local gatherings, to great exhibitions which can compare favourably with the best in England and Europe.

Towards the expenses of the shows, Government contributes on the £. for £. principle for the outlay on buildings, and five-eighths of the prize money, as well as frequently transferring suitable ground to Societies free of cost. Last year the sums so disbursed amounted to no less than £10,400 0s 0d.

Out of this total of 28 active Societies, 20 are affiliated in the Agricultural Union, a body composed of delegates from each Society which meets with more or less regularity once a year for the purpose primarily of fixing dates for the forthcoming shows, but which discusses matters of general farming interest and passes resolutions calling the attention of Government to various grievances affecting the industry, to desirable reforms, and generally to matters of interest to the farming community. By so doing and by discussion, the Union has no doubt in the past done much good work, and encouraged good feeling amongst the farmers of widely separated districts, and certainly amongst the delegates. As a result of certain decisions arrived at during the recent conference held in May last in Cape Town, the Agricultural Union appears likely to embark upon a new and enlarged sphere of usefulness. But it cannot be denied that in many respects the Agricultural Union merely duplicates the work of the Farmers' Congress. It is to be regretted that this mutual overlapping should occur, and the hope may be permitted that ere long the advisability of joining forces to attain their common ends may be realised.

Everyone recognises the great benefit which Agricultural Societies confer upon their districts by organising shows, and the good work done by and at these shows, especially the valuable educational influence which they exert. At the same time it is to be regretted that organisations capable of successfully carrying out all the multifarious arrangements connected with an annual show should not also be utilised for other purposes of mutual advantage, and for the further promotion of farming interests. While the ostensible aims of Agricultural Societies are many and most orthodox, there can be no doubt that with the great majority their one activity is the annual agricultural show, which being over they relapse into apathy for the next twelve months. Almost every Society commences by determining and placing on record its resolution to encourage "the improvement of existing breeds of farm stock, improvements of the present methods of arable and other farming, improvement of systems of cultivation and of the preparation of staples for market" and so on. This "encouragement" almost invariably takes the form of prizes at annual shows, of which Government pays more than one-half. That the original intentions of many of these Societies is something more than the ephemeral show may best be demonstrated by quoting replies to enquiries on the subject. The Secretary of one of the Societies writes:—"The Society deals with the development and encouragement of South African manufactures, and makes a speciality of trying to improve wool, mohair and feathers, as being largely represented in this part of the country." But in practice the "dealing with the development" amounts only to holding an annual show. Stellenbosch arranged a "course of lectures on viticulture in the Victoria College during the academic year, and is prepared to assist the College Council in the future, the Society's finances permitting, in providing instruction in subjects bearing upon agriculture." For this the Society deserves most honourable mention as being the first to attempt technical agricultural education, and may be held up as a worthy example for other Societies to follow. "To promote co-operation among the farmers and especially its members, and to obtain information for farmers, &c., is the avowed object of one Society, while another "is endeavouring to bring about co-operation amongst the farmers in agricultural matters." This from the far North-west: "To educate the farmer up to the standard of the 20th century, and to show him that old methods must be buried in the past, that farming has now become a science and must be studied as devotedly as any other profession." A small Western Province Society has a wide conception of its work: "The Society furthers not only agriculture but sees to the comfort of the travelling public at Railway Stations, &c.," while yet another in reply to a question as to its special aims naively replies "Not any."

The desirability of combining with the duty of holding an annual show some means of bringing the farmers frequently together for the interchange of ideas is thus expressed by the secretary of a Society: "I take the liberty of pointing out that the Society as at present existing is of no practical utility or good to the district, except as to arranging for an annual competition open to the whole Colony for subjects relating to agriculture. I beg to suggest that these Societies ought, to be of real benefit, to be worked on the same lines as the Divisional Councils—holding a meeting of its members or such of them as may be selected, say once a quarter, and on those occasions discuss such matters as the Government or any of the Society's members should place before the meeting for discussion or report."

Setting aside for present purposes the question of combination amongst farmers for commercial ends, there are yet many means for mutual benefit and enlightenment in addition to shows, which are at present practised in the Colony, but which might with great advantage be more generally adopted and which may well be mentioned here. Without going so far as to buy and sell jointly, farmers may make use of their Societies for the purpose of gaining information as to markets. Information, accurate and timely, is of immense importance in these matters, and a system whereby buyers notify to the Secretary their wants, or through which merchants can offer special terms to the members of a Society, offers advantages which no one can afford to ignore.

Half the secret of high prices lies in the way in which the article is placed upon the market. The packing of fruit, the sizes and weights of boxes to use, the taste of the market in such apparently trivial details as what feathers to leave in a plucked fowl or the fashionable tint of hen's eggs, are really matters of prime importance if top prices are to be obtained. The classing and sorting of wool, the size and shape of bales of oathay or lucerne, the weight of a pat of butter, and the best way to pack and despatch it—all these minor points materially affect prices.

Such information Societies are much more able to collect and disseminate than are private individuals; and here again is a wide field open for their activities.

Several Societies in their bye-laws propose to hold stock and produce sales for the benefit of their members, and some actually do carry on such work with considerable success. An enormous development awaits this kind of enterprise, if conducted along sound business lines. Sales at the close of our larger shows have not proved a great success, presumably on account of the absence of the business element from these gatherings and the holiday feeling that pervades the occasion. But fairs for mere buying and selling, when dealers can make a selection from all the saleable stock of the district on one spot and at one time, and in competition with other buyers, lead only to enhanced prices and brisker business.

"The prevention of the introduction of new pests, weeds or diseases, and the check of the spread of existent ones amongst live-stock and farm crops" is a pious intention of certain Societies, usually more honoured in the breach than in the observance. Yet how much might be done by taking common cause against the common enemy if only more Societies remained active factors throughout the year.

For the purpose of measuring the productive capacity of the Colony, and of gauging our progress in the various branches of agriculture, to enable the producer to market his wares to the best advantage, and to regulate supply in accordance with demand, it is absolutely essential that a systematic compilation of statistics be maintained. It is lamentable that in a country of the agricultural importance of the Cape we should still be so ignorant on these matters. The collection of these figures, and in turn the dissemination of the records, is a very serious undertaking, but one which might be materially facilitated by the hearty co-operation of Agricultural Societies and Farmers' Associations.

Besides the stimulus of the ring, the livestock of a district may be improved by farmers combining to procure the services of superior stud animals, while the reputation of a locality for some special class of stock may be built up and maintained by properly organised breeders' associations and organised stud sales. This class of combination will be referred to at length later on; it suffices here to say that Societies of this sort can, by securing a common policy in breeding, markedly influence the character of their livestock, and so facilitate the establishment of a reputation for a definite and fixed type which is of such enormous value to the breeders adhering to it. Co-operation of this sort in breeding, in disposing of produce, and in the interchange of ideas by lectures and discussion amongst the people most concerned—the farmers themselves—will do quite as much, perhaps more than all the handsome prize-lists and transient glories of the show-yard, to bring solid prosperity and wealth to the country districts. Collections of agricultural implements and produce are undoubtedly instructive, but field-trials and prolonged tests on the part of those who have to earn their living by their use, and the interchange of opinion on these points are far more enlightening.

Again, the best implements and machinery in the world are of but little use in unskilled hands. The friendly rivalry brought out by competitions whether in ploughing, reaping, shearing, driving, or the hundred and one other accomplishments of the farmer and farm labourer, is of the greatest educational value, and promotes that good feeling between master and man which everyone knows how to value. Nothing is easier than to arrange for competitions and field-trials under the auspices of an active and interested Agricultural Society, but without such support they are almost invariably failures.

The desirability of Government being in close and sympathetic touch with the farming population has of late been discussed throughout the country, and the palpable truth of the proposition generally admitted, but it has also appeared that facilities to bring this about are lacking. No more ideal link between the Government and the individual farmer could be imagined than voluntary associations of the rural population, ready both to voice their grievances and to utilise such benefits as might be obtainable for them; to focus, on the one hand, the views of the farmers, and on the other, to disseminate such information and aid as the Department of Agriculture has to offer.

Such, in brief, is the possible scope for our Agricultural Societies, and it is a cheering sign to observe the advances in the directions indicated that have occurred even within the last few months. There is still much room for improvement on all sides, yet there is good ground for the hope that we are on the eve of a brighter day of activity and prosperity for our Agricultural Societies.

While on the whole the rules under which the Agricultural Societies work are based on uniform lines, there are yet numerous variations, some of which are important. Naturally the rules change with the circumstances of each Society, some possessing elaborate constitutions and detailed bye-laws to meet their wider scope, while others appear to get along without any fixed rules at all. The rules have been framed to meet local needs without much attention to the Societies. The accompanying list has been compiled from the statutes of a number of Societies, none of which contain all that are here given, nor is it expected that the list, as it stands, can ever be adopted by one Society. They are given rather to indicate better than can any description, the scope and methods of our Agricultural Societies.

STATUTES OF......................AGRICULTURAL SOCIETY.

Article I Objects.

(*a*) The holding of competitive shows and exhibitions of livestock and of agricultural or other farm produce, also of implements and machinery.

(*b*) The holding of periodic (*i.e.*, monthly) stock and produce sales for members of this Society.

(*c*) To organise trials of skill in the use of implements and machines applied to farming pursuits.

(*d*) To discuss all matters generally appertaining to the agricultural or pastoral welfare of the district, and to secure united action when necessary.

(*e*) To communicate with and furnish information to the public authorities, similar institutions in other places, and individuals, on all subjects of farming interest.

(*f*) To obtain the removal, as far as such a Society can, of all the grievances affecting the industry, and to assist in obtaining desirable reforms.

(*g*) To collect and disseminate information useful to the members.

(*h*) To encourage the greatest care by the flock-masters, wine-farmers, and others in the preparation of their staples for market.

(*i*) The prevention of the introduction of new pests, weeds, or diseases, and the prevention and cure of existent ones amongst livestock and farm crops. With this object in view, it shall be the duty of every member to inform the Secretary, who shall forthwith bring to the notice of the Committee any report of any such disease, pest, or weed, or means of spreading or combatting the same that may come under his notice.

(*j*) The improvement of the present methods of arable and other farming by encouraging the use of labour saving machinery and the most approved classes of agricultural implements.

(*k*) The encouragement of the cultivation of crops best suited to the various parts of the Colony or area concerned.

(*l*) The use of fertilisers

(*m*) Improvements in the system of cultivating the soil.

(*n*) The improvement of the existing breeds of farm stock.

(*o*) The importation of thoroughbred stock into the Colony (or area).

(*p*) To encourage dairying in every possible way.

(*q*) To assist in promoting and protecting the farming industry.

(*r*) To encourage a friendly feeling and unanimity amongst farmers on all subjects affecting the common good.

(*s*) To adopt any other means which may be considered necessary from time to time in the general interests of the Society.

Article II. Name.

The name of the Society is the .. .. Agricultural Society. The office is in... ....

Article III Membership.

The Society is composed of an unlimited number of members.

Members are admitted on election by open voting at any meeting, after having been proposed and seconded at a previous meeting, and on payment of the annual subscription for the current year.

All members three months in arrear with their subscriptions shall not be entitled to any of the privileges of the Society, nor take any part in its proceedings until such arrears be paid.

Any member wishing to retire from the Society shall tender his resignation in writing to the Secretary, but such resignation shall not be accepted until any subscriptions due by him shall have been paid.

Every member of the Society shall subscribe to its rules, and shall be bound in all meetings by the majority of the votes, and shall be eligible for election to any of the executive offices thereof.

The full name and address of every member shall be given to the Secretary, and be written in a book to be kept for that purpose.

The Society may appoint a patron and vice-patrons.

The management of the affairs of the Society shall be vested in a President, two Vice-presidents, and an Executive Committee of (   ) other members, with power to add to their number, elected by ballot at the annual general meeting. One-third of such Executive Committee shall retire annually by rotation, but shall be eligible for re-election.

Article IV. Subscription.

The annual subscription shall be (amount) payable on (date).

Any member may compound for his subscription for future years by paying at once the sum of (amount)

After payment of ten or more annual subscriptions, a member may compound for future subscriptions by a single payment of (amount).

Article V. Meetings

An annual general meeting of the Society shall be held on or about the first week in the month of (May or July) in each year on such day as the Committee for the time being may fix, of which meeting seven clear days' notice shall be given by advertisement in the (local) newspaper

A special general meeting may be called on a written requisition of ten (10) members, addressed to the Secretary, setting forth the object of the meeting The Secretary shall forthwith convene the meeting, within ten days of the requisition being lodged with him, stating the principal objects of such meeting

The President shall be empowered to call any special meeting at his discretion in case of emergency.

Ordinary meetings of the Society shall be called monthly (or quarterly as the case may be) at such place and date as shall be found advisable (or this may be specified), (seven) to form a quorum.

At all meetings the Chairman for the time being shall, in addition to his deliberative vote, in all cases where voting is equal, have a casting vote

At all meetings of the Committee (three) shall form a quorum

Article VI.—Procedure at Meetings

In every case of a meeting of members, if, after the lapse of a quarter of an hour from the time appointed for the meeting, a quorum shall not be present, it shall thereupon stand adjourned to such day and hour as those present may determine

At all meetings of members, the President shall *ex officio* preside as Chairman failing whom, the Vice President, failing whom, those present shall elect a Chairman from amongst themselves.

No new rules, or alteration or suspension of rules shall be made without the sanction of two thirds of the members present and voting at which not less than ( ) members shall vote

No new rules or alteration or suspension of rules shall be brought forward, and no resolution passed at a meeting shall be rescinded, unless due notice of the intention to do so has been given at the previous meeting, or unless intimation of the fact has been duly made in the intimation of the meeting.

At the Annual General Meeting of the Society, the Annual Report of the Executive Committee and the statement of accounts together with the balance sheet for the preceding twelve months, duly certified by the auditors, shall be submitted, the Committee shall be elected, and other general business discussed

Seven (or other number) members shall form a quorum at any general meeting, provided always that any motion of importance, should such be the ruling of the Chairman, can only be adopted when not less than two thirds of the members are present, unless —

(*a*) Notice of such motion has been given at the previous meeting

(*b*) Notice of such meeting has been given to each member by post or otherwise through the Secretary, at least three days before the meeting

Voting

Every member shall be entitled to vote by proxy his written authority to so vote must be handed to the Secretary before the commencement of any discussion on the subject that the proxy will be used to vote upon. (Several societies expressly forbid voting by proxy)

At all meetings of the Society, voting shall be by a show of hands, unless a ballot be demanded by any member, which in that case shall be taken at once

At every ordinary meeting of the Society or of any Committee appointed for that purpose, the following order of procedure shall take place —

(*a*) The minutes of the former meeting shall be read and adopted by the members present, and on confirmation, shall be signed by the Chairman in a book specially kept by the Secretary for this purpose

(*b*) The report of any Committee, standing or special, shall be considered

(*c*) Discussion of any subject, reserved at any former meeting for further consideration

(*d*) Discussion of any subject of which notice has been given.

(*e*) Any other competent business

The order list may be suspended at the request of any member, such request having been duly seconded and carried.

All questions of procedure shall be determined by the Chairman.

Any person refusing to obey the ruling of the Chairman, when called to order, shall be fined the sum of 2s. 6d. for every such offence, and upon refusing to pay such fine, his name shall be erased from the books of the Society.

Language.

Either language may be used, but any member may demand the translation of any speech, motion, resolution, or discussion.

Article VII. Dispute.

All matters of dispute, or complaints connected with the administration of the affairs of the Society, shall be made in writing to the Secretary, the decision of the Committee thereon shall be final, unless they deem it expedient to call a general meeting to consider and decide upon the matter, in which case the decision of such general meeting shall be finally conclusive thereof.

Article VIII General Powers of Committee.

The Committee shall have power —

(1) To collect and receive subscriptions and other moneys on behalf of the Society.

(2) To frame rules for and arrange all details connected with shows, exhibitions and competitions, fairs, sales, etc.

(3) To frame Prize Lists.

(4) To pay out of the funds of the Society such prizes as may be awarded, as well as to discharge any other of the Society's liabilities.

(5) To frame such bye-laws and regulations for the general management of the Society and its concerns as they may deem necessary, provided they be not in conflict with the rules, which shall be submitted to a general meeting of the Society for consideration and approval.

Duties of Committee

(1) To present a report and a financial statement of the year's proceedings at the annual meeting.

(2) To call a general meeting at any time on giving fourteen (14) days' notice of their intention to do so, and stating the object for which such meeting is convened.

(3) Annually to appoint two auditors, of whom only one shall be eligible for re-election at the expiration of his term of office, whose duty it shall be to examine and report upon the accounts presented to the annual general meetings that the books of Revenue and Expenditure have been examined, and that from these have been prepared a statement of revenue and expenditure and a balance sheet shewing the financial position of the Society, which shall be published for general information in such manner as the executive may direct, and submitted to the Society at each annual general meeting.

(4) To discharge and appoint officers (c.f. Article VI).

(5) To appoint sub-committees (c.f Article VI)

(6) Generally to manage the affairs of the Society in such a manner and to take such steps as it may deem necessary for promoting the objects of the Society and for carrying out the instructions of general meetings.

The Executive Committee or other Committee shall meet for the despatch of business at such times and places as they may decide upon. Meetings shall be convened at the instance of the Chairman or, in his absence, of a Vice-Chairman, by notice posted to the members of Committee at least seven (7) days previous to the day fixed for the meeting.

At any meeting of the Executive Committee (3) shall form a quorum. The Executive Committee shall annually appoint a Secretary and Treasurer (or a Secretary and a Treasurer) who shall be bound to render proper accounts to the satisfaction of the Committee, and shall have power to discharge or accept the resignation of such officials.

Any member of the Executive Committee absenting himself from (3) consecutive meetings (or months) without leave, shall vacate his seat and such vacancy may be filled by the Committee until the next general meeting from amongst the members of the Society. The executive may grant leave of absence to any of its members for a period not exceeding six months but no more than ( ) members shall have leave at any one time.

Sub committees shall be appointed as may be required by the Society or by the Executive Committee with such powers as may be considered necessary to carry out the special objects for which they may be appointed.

Article IX.—Finance.

The financial year of the Society shall begin on the 1st day of July of each year and end on the 30th day of June in the following year.

The subscription shall be ( ) per annum payable to the Secretary in advance.

All funds of the Society shall be lodged in a bank, selected by the Committee, in the name of the Agricultural Society. All payments of One Pound (£1) or more shall be by cheque signed by the Secretary and countersigned by the Treasurer (or President). No liabilities shall be incurred or payments made without the sanction of the Committee

All property of the Society shall be vested in the President and Vice-Presidents for the time being, as trustees who shall be the pröper persons to sue or to be sued on behalf of the Society. The Treasurer shall receive all moneys from whatsoever source derived, and grant receipts and shall make all payments on behalf of the Society, provided the accounts so paid have been authorised by the Committee (or President). All money so received and paid shall be entered into a book provided for the purpose.

All books to be open for the inspection of any members.

Indemnification.

The members for the time being of the Society shall save harmless, and idemnified keep the President, Vice-President and Committee or any member thereof, of, from and against all losses, costs, actions, damages and expenses, which they or any one of them may sustain or be put to, in or about any matter or thing in the affairs of the Society. That out of the available bank balance the sum of .... Pounds (£) be set apart as a Reserve Fund to be suitably invested by the Committee, and that neither the whole nor any portion of that amount be devoted to any object without the sanction of three fourths (¾) of the members of the whole Society.

All subscriptions shall be due and payable to the Treasurer on the 1st day of July in each year, by whom a receipt will be given for moneys paid to him.

Article X. Arrangement of and at Shows.

The annual subscription shall entitle all members to tickets admitting them to the Society's shows during the year

All exhibits at the shows of the Society, must be the property of the exhibitors, and in the case of farm produce, must have been grown in South Africa by the exhibitor within the twelve months preceding the show.

Any exhibitor giving a wrong description of his or her exhibit, with the intention of deceiving or defrauding the Society, shall be debarred from exhibiting at any of the Society's shows, and the particulars of the case shall be published in the Society's proceedings. All prizes not claimed within six months of award shall be forfeited to the Society.

The Society's shows shall be open to all Colonial, British and foreign exhibitors and competitors, subject to such rules, bye-laws and regulations as may be framed by the Committee.

Judges for every class of exhibits shall be appointed by the Committee; but no person shall be qualified to be a judge in a class (or section) in which he is interested as an exhibitor or competitor. The judges shall have the power to withhold a first or other prize in any class, but may award a lower prize in lieu thereof.

That the Societys grounds and buildings, besides being used for agricultural purposes be granted, on written application, for such other purposes, as are not likely to give offence to residents in the neighbourhood, with full consent of the Committee.

The Judges shall have power to recommend for special prizes, entries sent in for exhibition only, such to be awarded at the discretion of the Committee.

(Many Societies have found it convenient in place of having only one small Committee, to appoint in addition a large general Committee, sometimes numbering over half the total membership, to assist in arranging and carrying out the work of the annual show.)

Articles XI. Copies of Rules.

The Rules and Bye-laws shall be printed in English and Dutch, and a copy transmitted to every member of the Society by the Secretary. A list of Officers and Members, and the Rules and Bye-Laws, shall be posted up in the office of the Secretary for general information.

Article XII. Non-political character.

The Society is entirely non-political in its nature.

JAGZIEKTE OR CHRONIC CATARRHAL PNEUMONIA IN SHEEP.

Mr. S. F. Lautré, of Smithfield District, O.R.C., writes:—I should be much obliged to obtain from the Chief Veterinary Surgeon, through your *Journal*, some information as to the nature of an affection which is doing considerable damage amongst sheep.

After the restoration of Peace, many sheep from the Cape Colony were brought into this Colony by speculators. Like several other purchasers of this class of sheep, I found amongst my flock, from time to time, a sheep or two coughing, emaciating, and eventually dying from well-marked pulmonary mischief.

A lull took place during the great drought last year. But since late autumn, this year, the disease has re-appeared—so much so, that in three months over 50 have died or have been killed for fear of infection.

Briefly the symptoms are as follows:—The sheep is first noticed to breathe rapidly, with movement of nose wings. There is coughing. Up till the end of July the condition of the sheep was remarkably good for the external lesions of the lungs. Now the falling off is the first symptom noticed. The head may be dry and the back arched, and more or less dullness of expression. On placing the animal on its haunches, and pressing in the chest at the armpits, pain is often elicited. There is often a fremitus heard and felt. On holding the head downwards and hind legs up, very little comes into the mouth and nose. It is useless to feel the pulse, as a sheep caught is very excited. The temperature varies from 101° to 103° F., and sometimes goes to 104°, in that respect not differing from sheep apparently healthy—as repeatedly tested.

Post mortem appearances are fairly constant. The blood is dark and seems to contain many small bubbles. The lung (or lungs) is pale, consolidated in part, with pleural adhesions, generally at base. The area round affected parts is not very congested. On section, the tissue has a firm appearance and feel. At times the knife gives a gritty sensation. The tubes issuing therefrom contain a clear fluid, which further on becomes frothy. The trachea is seldom red. No signs of worms in it, nor in the tubes. Further the lungs are more or less studded with round abscesses in all stages of evolution. Yellow nodules are often found in the liver. The mediastinal glands are generally a mass of abscesses, which cause death by pressing on the windpipe. Sometimes the inflammation has extended to the pericardium. The other organs, though not quite normal, do not present any distinctive or constant pathological features.

These symptoms, or rather features, do not tally with what old experienced farmers call jagziekte.

Many Boers, and amongst these, men known as enlightened sheep farmers, declare that the disease is due to ducking the head of the sheep in dip containing Cooper's Powder, and are emphatic about it. One man has just lost 70, and is confident the last of the series has gone.

In favour of this contention, as regards my own flock, I have to state that in 1903 and 1904 I used Nicotine and Little's Dip only, and lost but few sheep. This year, in April, I have used Cooper's Powders alone, twice at 15 days interval. My dip is 6 ft. square, 5½ ft. deep. The capacity was calculated and one packet used per 25 gallons water. The sheep were thrown in, haunches first, the body leaning slightly forwards, so as to come up properly. The throwing was done with sufficient force to let the head disappear also. After fully one minute, the sheep would be let out and a dipping of head be again practised by means of a forked stick, as they passed into the passage leading to steps. Over 2,000 were treated in five hours. I must add, the catching and dripping pens are very conveniently constructed to expedite matters.

Against the theory of poisoning by arsenic I have to adduce the following arguments. If the dip be taken in excess into the system, either gastritis or bronchitis and pneumonia will take place within 48 hours of ingestion. Should the arsenic be absorbed by the skin, the lesions would be simultaneous in all the poisoned sheep. Now all sheep destroyed until August since May have apparently shewn the same stage of disease. I have been unable to detect the disease sufficiently early to see it in its initial stages.

A friend close on 60 had never seen the disease before the war. His sheep were also bought from speculators, and he has it too, though he has dipped his sheep in the same mixture as of yore. He also believes in the contagious nature of the malady, and, like me, thinks the former owners had good reasons to get rid of their sheep! I will give only one more argument. A boy on the farm owns 30 sheep, running alone; these were dipped after mine, in a most reckless way, and had their heads repeatedly submerged. Not one of them has become ill.

As in all the writings I possess of Dr. Hutcheon, there is no mention of such an affection, I have written at some length, with the hopes that the disease will be identified and good advice given, for which, I am sure, more than one farmer will be very grateful.

Mr. D. Hutcheon, C.V.S., Acting Director of Agriculture, offers the following notes on the above letter:—I have carefully read Mr. Lautre's letter and although the *post-mortem* lesions which he describes include numerous abscesses in the lungs and mediastinal glands, which are not common in uncomplicated cases of

"Jagziekte," yet I am of opinion that the main cause of the mortality amongst Mr. Lautre's sheep is that disease.

Jagziekte is a special and peculiar form of inflammation of the lungs, which affects sheep principally but may affect goats. It is met with over a large area of the Colony, but it is most prevalent in the high and cold districts of the Colony, during the winter months more particularly. It bears a close resemblance to catarrhal pneumonia, with a tendency to terminate in interstitial pneumonia. Its course differs, however, from ordinary catarrhal pneumonia. It usually commences in one or more separate lobules of one or both lungs, and gradually extends until the greater portion of the organs becomes involved. There is still, however, a distinct and almost abrupt line between the diseased and healthy lung tissue.

In uncomplicated cases there does not appear to be any tendency to breaking down of the lung tissue, or the formation of abscesses, but the latter may be met with when the affected animals are left out exposed to the cold weather. Usually the smaller bronchi of the affected part become filled at first with catarrhal products, and at the same time there is an inflammatory exudation into the interlobular tissue. On making a section through the diseased portion at this stage, the more recently affected parts present a pale purplish colour, with small white purulent looking spots studded all over the surface. As you approach the centre of the diseased portion, these white purulent spots increase in number but diminish in size, and the cut surface presents a semi-solid appearance of a pale yellow colour, and an oily soapy feel. In still more advanced cases the diseased portion becomes drier, hard and resisting to the knife, the interlobular tissue cutting like a piece of crisp cartilage.

The pleura, or covering of the lung, is not affected in the early stage of the disease, but after the diseased action has extended, the pleura over the affected part becomes thickened and inflamed, and adhesions form between the pleura covering the lungs, and that lining the ribs. There is no tendency to recovery, even when the affected sheep are early placed in a comfortable house and carefully nursed. Under such care and comfort, however, the affected animals may last for many months, the breathing slowly but steadily becoming quicker and more difficult.

The character of the lung lesions, and the process of the diseased action are quite different under such favourable conditions. There is very little catarrhal mucus in the bronchial tubes—as seen in the acute and complicated cases. The small bronchi become compressed and diminished by the thickening of the interlobular lung tissue, which also becomes leathery and inelastic; the lung losing its power of expanding. The animal ultimately dies of asphyxia.

Symptoms.—There is no perceptible constitutional disturbance in the early stages of the disease, except an occasional cough. As he disease action extends, the cough becomes more frequent and the breathing more rapid, until in the later stages the poor beast stands with its ribs fixed and flanks heaving, panting for breath, hence the Dutch name "Jagziekte," or droning sickness.

Cause.—The disease is met with principally in the high and cold districts of the Colony, and in these districts it is most prevalent during the winter months. It would appear, therefore, that cold and exposure are conditions which favour the development of the disease. But the special character of the disease, and its persistence independent of any curative measures hitherto adopted, clearly indicate that its originating cause is something independent of, or at least in addition to, the cold and exposure. There is strong evidence also that under certain conditions the disease becomes communicable from an affected to a healthy susceptible animal, but all artificial attempts to communicate the disease by inoculation with the blood or the inflammatory products have hitherto failed. Neither have healthy sheep contracted the disease when kept in the same pen with affected animals for many months. Of course these animals were kept in comfortable pens at our experimental station. The proper conditions in which to conduct such a test would be a small camp somewhere in the districts where the disease occurs naturally. It manifests all the characteristics of a specific infectious disease, however, and when it is realised that curative treatment has hitherto failed, although a great many remedies have been tried, the most profitable way of dealing with such cases is to slaughter them immediately the presence of the disease can be detected, while they are in good condition. The flesh is perfectly wholesome, as the diseased action is confined to the lungs, and there is no perceptible fever until the late distressing stage of the disease arrives, and by that time the animal is reduced to a skeleton.

If treatment is to be tried, the most essential thing is to place the affected animals in a comfortable shed at night, and allow them to run by themselves during the day. Repeated doses of a mixture of sulphur and tar, are the remedies which are most favourably spoken of. Turpentine and paraffine oil have also been recommended, but as already remarked, there does not appear to be any tendency towards an arrest of the diseased action.

With respect to the influence of dipping on the development of this form of disease of the lungs, I do not think that the arsenic in the dip has any special influence in causing the development of the disease. I am quite prepared to admit, however, that if a portion of any dip were to enter the larynx and pass into the bronchial tubes, setting up local irritation it might be an exciting cause towards the development of the disease.

It is not necessary that the quantity of dip inhaled should be so large as to set up acute inflammation of the lungs, which would be manifest, by the symptoms exhibited within forty eight hours. Sheep will often suffer from considerable lung lesions without exhibiting any visible indications of its presence. For that reason in dipping sheep or goats, in any dip but especially one which possesses irritating or poisonous properties, the animal should be carefully put into the bath head first, so that it can see where it is going, and make the necessary preparation for the plunge, and avoid over-crowding, during which some sheep, and especially goats, may get their heads caught under the others. and forcibly held under the bath and in their struggles to free themselves, gasp and inhale the irritating fluid. It is just possible that the abscesses found in the lungs and mesenteric glands of some of the sheep examined by Mr. Lautre may have had their origin in something that set up acute inflammation in the lungs.

LONDON SHOW OF COLONIAL GROWN FRUIT.

The President and Council of the Royal Horticultural Society, Vincent Square, Westminster, London, S.W., have decided to hold at their new hall, a Show of Colonial Grown Fruit, on December 5th and 6th, 1905, to be followed by others in March, May and December, 1905. The object of fixing these dates is, if possible, to suit the season which is most likely to find the produce of Canada, British Columbia, and the West Indies, of India and the Cape, and of Australia, Tasmania and New Zealand, in the greatest perfection in London.

In order to allow intending exhibitors and others time to make their arrangements, the Council have ordered the subjoined schedule to be issued. Opportunity is afforded for each Colony to make collective exhibits in addition to the exhibits of individual firms. The Agents General and Crown Agents are most kindly rendering every assistance, and we trust that both growers and shippers will do their best to send in exhibits worthy of our Colonies, and to show what can be produced for the Home markets. No entrance fee or charge for space is made, and tabling is also provided free of expense. If desired, any produce may be consigned direct to the Society, and it will be stored in the cellars at Vincent Square and staged by the Society's officials, but the Society cannot undertake to repack and return any exhibits. Medals and other prizes are offered by the Council in each class.

DIVISION I.—COLONIAL GROWN FRUIT AND VEGETABLES.

Awards will be made in Classes 2—24 only when staged separately from Class 1, and not when included in it. The Colony in which the fruit has been grown must in all cases be stated. Medals and other prizes will be awarded in each class at the discretion of the Council.

Class 1.—Collection of Fruit and Vegetables. Class 2.—Collection of Apples (Dessert). Class 3.—Collection of Apples (Cooking). Class 4.—Collection of Pears. Class 5.—Pine Apples. Class 6.—Bananas. Class 7.—Mangos. Class 8.—Grapes. Class 9.—Oranges. Class 10.—Limes and Lemons. Class 11.—Shaddocks, Pomelos and other like Fruits. Class 12.—Peaches and Nectarines. Class 13.—Plums. Class 14.—Melons. Class 15.—Tomatoes. Class 16.—Nuts. Class 17.—Yams, Sweet Potatoes, and other Tubers. Class 18.—Vegetables, other than Tubers. Class 19.—Any other Colonial Grown Fruits or Vegetables.

DIVISION II.—PRESERVED FRUITS, JAMS, &c.

Dried or preserved Fruits of any sort or kind may be shown subject to the condition of their being tasted by the judges, and of their having been grown in a British Colony.

Class 20.—Colonial Grown and Bottled Fruits in clear glass bottles. This exhibit must not occupy a space greater than eight feet by six feet, and must not be built up more than two feet high in the centre. All alike must be Colonial grown and Colonial prepared. Class 21.—Colonial Grown and Tinned Fruits. This exhibit must not occupy a space greater than eight feet by six feet, and must not be built up more than two feet high in the centre. All alike must be Colonial grown and Colonial prepared. Class 22.—Colonial Grown and Dried Fruits. This exhibit must not occupy a space greater than eight feet by six feet, and must not be built up more than two feet high in the centre. All alike must be Colonial grown and Colonial prepared. Class 23.—Colonial Grown and Preserved Vegebles. (Either Bottled, Tinned or Dried). This exhibit must not occupy a space greater than eight feet by six feet, and must not be built up more than two feet high in the centre. Class 24.—Colonial Grown Fruits made into Jam, Jelly, Syrup, &c., in the Colony, and shown in clear glass bottles, all alike must be Colonial grown and Colonial prepared. Entries close Tuesday, November 26th, 1905.

Return of Fruit Shipped to England from the Port of Cape Town, December, 1904, to May, 1905.

Date.	Variety of Fruit.	No. of Packages.	Quantity No.	Declared Value.		
				£	s.	d.
December, 1904	Peaches ..	149	2,430	24	0	0
	Plums ..	52	1,100	11	10	0
	Apricots ..	103	2,060	21	0	0
				£59	10	0
January, 1905.	Peaches ..	639	11,470	156	7	0
	Plums ..	1,658	36,546	414	10	0
	Apricots ..	299	6,040	74	15	0
	Nectarines ..	48	964	12	0	0
	Pears ..	28	500	7	0	0
				£664	12	0
February, 1905	Peaches ..	1,865	24,441	473	9	0
	Plums ..	2,392	57,097	587	12	6
	Nectarines ..	355	5,829	89	4	0
	Pears ..	2,773	50,256	706	5	0
	Tomatoes ..	12	176	1	15	0
	Grapes ..	227	4,279 lbs	77	15	0
	Apples ..	37	1,125	9	5	0
				£1,945	5	6
March, 1905	Peaches ..	265	5,260	56	16	0
	Plums ..	2,238	48,366	546	6	0
	Apricots ..	1	25	0	5	0
	Nectarines	1	20	0	5	0
	Pears ..	1,690	37,113	432	9	0
	Tomatoes ..	6	120	1	5	0
	Grapes ..	5,437	118,404 lbs	1,820	10	3
	Melons ..	8	30	3	18	0
	Apples ..	85	1,700	23	5	0
	Quinces ..	4	169	1	0	0
	Grenadillas	1	50	0	2	0
				£2,886	1	3
April, 1905	Pears ..	548	10,950	138	18	0
	Persimmons	1	25	0	5	0
	Quinces ..	29	434	4	10	0
	Apples ..	16	380	4	12	0
	Pine Apples	19	228	7	0	0
	Grapes ..	1,533	20,370 lbs.	391	6	3
				£546	11	3
May, 1905	Pears ..	14	280	3	10	0
	Pine Apples	4	160	2	10	0
	Guavas ..	1	100	1	0	0
				£7	0	0

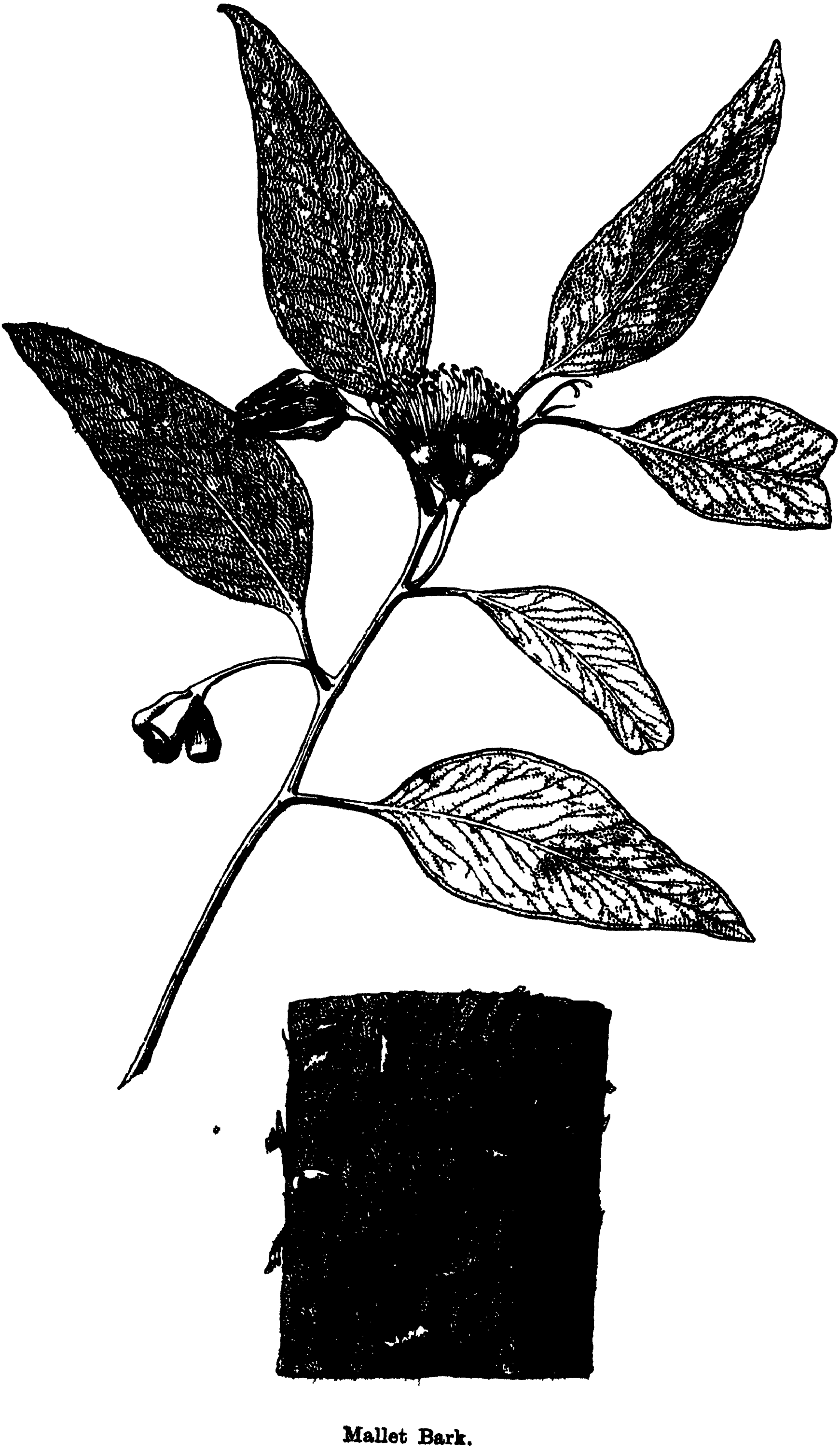
MALLET BARK.

Mr. D. E. Hutchins Conservator of Forests, Western Conservancy, writes:—Notes have appeared in the *Agricultural Journal* regarding the new Mallet bark industry in West Australia. I am in receipt of further information on the matter. Mr. H. E. Day, who has recently returned from an extended tour in Australia and Tasmania, informs me that the accounts of this Mallet bark industry in West Australia are not one bit exaggerated. Shiploads of Mallet bark are being sent from West Australia to Europe, and, in his opinion, the Black Wattle industry of Natal is seriously threatened. Mr. Day has also given me a sample of the West Australian Mallet bark, which can be seen by anyone interested in the matter. It is now in the Forest Museum attached to the forest office, Carlton Buildings, Parliament Street, Cape Town. This piece of bark is ¼in. in thickness. It is free from fibre and cuts easily with a knife, having the consistency of cinnamon bark. The taste of the bark is that of a powerful astringent. Examination with a botanical lens shows nothing peculiar in the structure of the bark.

A misprint in my last note on this bark in the *Agricultural Journal* may be noted. I say "In some instances the bark has been found to contain the almost incredible quantity of half its weight of tannin." As printed this appears as" "most incredible quantity." Samples of Pycnantha Wattle bark (*Acacia pycnantha*) containing up to 38 per cent. of tannin have been analysed, and recorded years ago.

I have received the following letter from Mr. C. B. Richardson, Acting Inspector General of Forests, Western Australia:—In reply to your letter of the 10th April, *re* Mallet seed, I beg to inform you that same is not at present obtainable; but if you apply again in next September I shall endeavour to procure a supply for you. I should think the Mallet could be grown successfully near Cape Town, as I understand the climate there, is very similar to ours. This tree is found extending East and West along our Great Southern Railway Line and appears to prefer the poorer class of country, being found growing upon the ironstone hills and ridges. The tree attains a height ranging from 40 to 50 feet with a stem diameter in many instances of from 16 to 24 inches. This tree is scattered in patches over a large area of country with a scanty rainfall and is found to attain large dimensions on the ironstone ridge, and does not confine itself to the banks of the water courses.

Writing under date the 20th July, Mr. F. H. Vachell of West Australia, says: — ***Eucalyptus occidentalis,*** locally known as the "Mallet" and Flat-topped Yate, grows to a considerable size and cannot be described as a shrub. In many instances it was found to attain a height of 50 feet with a stem diameter of two feet. I will try to get this seed for you."



Mallet Bark.

CATTLE TICK DIPPING MIXTURES.

Arsenite of Soda, Cheap and Effective.

Mr. Walter A. Edmonds, of Ewanrigg, Kei Mouth, one of the pioneers of Tick eradication, writes under date September, 13th :—In a most interesting communication from Dr. Hutcheon, C.V.S., relative to the value of dips as destroyers of ticks, and giving an analysis of same, the following appears :—"The common Queensland formula of dip is one pound of arsenic to 50 (fifty) gallons of water etc., etc." Is there any reason why we should not make this dip and how is it best prepared? Having systematically fought the ticks for some eight years I am very keen to get my farm quite clean but find filling my private cattle tank a costly job. I buy Cooper's sheep dip at 52/6 nett., enough for 1,000 gallons. Alderson's I am quoted at 100/- nett. per case, say 71/6 per 1,000 gallons. Arsenic I can buy at 4d. per pound say 6/8 per 1,000 gallons. The cost between arsenic for 1,000 gallons 6/8, and say 52/6 is very disproportionate.

I am told arsenic is only soluble in water by boiling with carbonate of soda or potash. Could not wood ash be used instead of potash ? I find my cattle tank saves much labour and is quicker than my former methods of spraying, hand dressing etc., although for the Bont tick I find occasional hand work still necessary.

The above letter opens up the whole question of tick destroying, and knowing that certain tests have been made by the Veterinary Branch of this Department, we referred the subject to Mr. D. Hutcheon, C.V.S., Acting Director of Agriculture, who replies in the following memorandum :—

In reply to Mr. Edmonds, I may preface my remarks by stating that this department has conducted a series of dipping experiments with the majority of the cattle dips for ticks at present in the market, and, in addition, Mr. Story who has been conducting these experiments, embraced every opportunity of watching the results obtained by the dipping operations conducted at other dipping centres with different dipping mixtures. As represented in a previous communication, our experience shews that the efficacy of a dip for the destruction of ticks, depends mainly upon the percentage of the arsenical compound which it contains. It is equally clear that when we want to use an arsenical compound of sufficient strength to kill the ticks, and yet be safe to use, it is most important that the mixture should be a perfect solution, which will remain of a uniform strength during the whole time that it is being used. There must be no risk of one animal getting immersed in a more concentrated solution than the other.

Further, our experiments have clearly shewn that all the efforts hitherto put forth by experts to manufacture an adhesive dipping mixture, which is capable of maintaining its action on the animal's skin for a considerable time, and thus effectively preventing re-infestation by ticks, have signally failed. Hence, there is no longer any special reason for increasing the price of the mixture, by adding such non-essential ingredients. Besides, although an adhesive arsenical mixture does not prevent the ticks from attaching themselves to the skin, it would tend to maintain the action of the arsenic on the constitution of the animal, and greatly add to the danger of repeated dipping at short intervals. It has been experimentally proved that even the addition of soft soap to a strong arsenical solution, has this effect.

In order to test the correctness of these opinions, Mr. Story was instructed to conduct a series of dipping experiments with a solution of arsenite of soda, and the following is a summary of his last report:—

"Since my last report I have been dipping at the increased strength of one pound of Arsenite of Soda to twenty gallons of water, which according to the analysis made has an arsenical strength of one pound in thirty gallons, and I am pleased to be able to report a much more satisfactory result.

"Over two hundred head, from young calves upwards, have been dipped in this strength without accident. A few shewed very slight stiffness with a little crinkling of the skin here and there, but nothing to speak of, and not more pronounced than with any other dip.

"The following are the death per-centages of the fed Blue Ticks collected:—

Strength of Dip.		Ticks Killed.	Ticks egg-laying.
One pound	Lot 11	58 per cent.	42 per cent.
to	12	65 "	35 "
20 Gallons	13	60 "	40 "
	14	91 "	9 "
	15	76 "	24 "
	16	75 "	25 "
	17	76 "	24 "

"The average percentage of deaths, therefore, is 71, which you will observe on referring to previous reports, compares most favourably with any dip I have yet tested.

"On examining animals after dipping, I observed a decided improvement on the first test, when using one pound to 25 gallons. By the second day much more discolouring among the nymphs was seen, practically all of which were dead. The Bont males were all killed and a good many young Blue females were sickly. By the fourth day a large number of partially fed Blue females were dead, and fully fed specimens fit for collecting were very scarce.

"One dipping in particular shewed a very satisfactory result, the examination of which twenty-four hours after, coincides with the death rate of the fed Blues collected (Lot 14). To quote from notes made in the kraal, "Practically every male Bont was dead within 24 hours. Very few female Bonts but most of them sickly. A fair number of unfed to half fed female Blues dead. Nearly every Red and Bontleg (male and unfed female) under tail and on back of udder, dead. Result very satisfactory."

"Although the results of all four dippings at this strength (1 to 20), were very satisfactory, none quite came up to the last mentioned in point of efficacy: probably the atmospheric conditions were more favourable, although I can remember nothing of note in the weather.

"No ill effects have been noticed on any of the cattle dipped either in regard to appetite or movement. Now and then one sees an animal walking with less freedom of action than another, but where no scalding is evident it is probably due to causes other than the dip, as there are plenty of chances of slight injury before dipping operations are completed and cattle return to their camp.

"The Arsenite of Soda dip dries off very quickly, little more than half an hour on a good day will dry most animals. It is a very easy dip to prepare, and being so concentrated there is comparatively little to handle in preparing a tank. It is an unpleasant dip to prepare, however, in windy weather, on account of the fine dust that is blown about when weighing, some of which one can hardly avoid inhaling. It is advisable, I think, under such conditions, that weighing should be done under cover and not in the open.

"In preparing the Arsenite of Soda dip, it is necessary to dissolve it in boiling water. One gallon of boiling water dissolves 3 lbs of the Arsenite; after which it mixes freely with cold water. The strength used is 1 lb in 20 gallons of water or 5 lbs. in the 100 gallons. With respect to the price it amounts roughly to three pence per pound, making the cost of the mixture about 1s. 3d., per 100 gallons.

"Four hundred sheep have been dipped in Arsenite of Soda at strength one pound to twenty-five gallons plus five pounds soft soap to each hundred gallons. The sheep were detained in the tank for one and a half minutes. No bad effects on the sheep were apparent.

"Previous to this last dipping Mr. Roberts dipped fifty sheep (Bastard Persians and Merinos), in one pound to twenty gallons without soap. The sheep were kept in the tank for about two and a half minutes, swimming most of the time. Two Persians died, and five fell sick but afterwards recovered. The merinos were unharmed notwithstanding six of them were dipped in the same strength for two minutes, two day previously. The Persians evidently with their shorter and less greasy wool, had absorbed more arsenic than the

Report on Glen Avon Dipping Experiment.

In compliance with your instructions, I carried out the experiment of repeatedly dipping 100 sheep in Cooper's Dipping Mixture, an arsenical compound, with the object of watching the results. The dip was used at the ordinary strength recommended by the proprietors. The following is a brief account of the dates on which the flock was dipped, and the results of the ten successive dippings.

Number	Date	Interval in days	Number of sheep	Remarks.
1st Dipping .	3rd Nov., 1904	—	100	2 minutes in dip 1 died of disease, cause uncertain
2nd " .	19th Dec., "	26	99	Sheep not improved several casting wool
3rd " .	4th Jan., 1905	16	99	Sheep not improved, 1 killed by jackals
4th " ..	23rd " ,	19	98	Sheep improving
5th " ..	17th Feb., ,	25	97	Sheep improving 1 left behind at pasturage
6th " ..	6th Mar "	17	98	Dipped by A Brown. 1 sheep missing.
7th "	1st April "	26	97	Dipped by L Brown
8th "	15th " "	14	97	No improvement in condition. 1 died Geilziekte
9th " ..	29th " "	14	96	1 sheep casting wool, otherwise sheep look well 2 died same evening and 1 next morning.
10th " ..	15th May "	16	89	4 left behind at grazing.

The sheep were one minute in the tank at each dipping except the first Except at the sixth and seventh dippings I was personally in charge, at the ninth I had no reason to expect a bad result and the weather was very suitable. The long interval between some of the dippings was occasional by postponements on account of the weather being unfavourable.

On May 25th Mr. L. Brown reported verbally that about six sheep were casting their wool, skins inflamed and suffering from the drastic effects of the dipping. One was very sick and he expected it to die. Many looked thin and a bit off colour. On 29th May in a letter he says "two are still very sick as a result of the dipping." On August 13th: "Your hamels are now in good condition. I examined the wool and find there is a break where you left off dipping. The wool has also fallen off several and some have died from the effects of arsenical poisoning leaving the number at 92." On September 11th "Your hamels are now looking well, a few, three I think, have since died from the effects of the dip and the wool has a decided rotten break at the juncture of growth since last dipping.

These sheep were all 2—6-tooth (mostly 4-tooth), merino hamels at the beginning of the experiment, and have been upon excellent mountain veld throughout the whole period. Other sheep of the same age and stamp and put there about the same time were long ago sold off as fat.—I have, &c.

J. Spreull, M.R.C.V.S.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome

Questions are also invited In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible

All letters or contributions should be plainly addressed "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown," they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication

Spraying *vs* Dipping.

To the Editor, AGRICULTURAL JOURNAL

SIR,—There is an old saying,—"When you have a bad case abuse the opposing Counsel" The Hon Arthur Douglass, as a last resort, has adopted this method He warns the public against my statements, for he says "It is not the first time that Mr Roberts has done considerable harm to the cause of tick eradication by publishing surmises as ascertained facts" Going on he tells quite a nice little story about how I recommended Cooper's Dip, and, how, owing to his warning, Mr Lounsbury came to investigate, finally finding Cooper's Dip an utter failure To further convince the public, I would ask Mr. Douglass to produce these published surmises, and I would also respectfully ask Mr Douglass to tell the public that when he says "I sounded a note of warning, and Mr Lounsbury, the Government Entomologist, went up to Mr Roberts's farm," he does not mean that it was owing to *his* note of warning that Mr. Lounsbury came to my farm, as his words suggest, but that Mr Lounsbury came, on *my* invitation.

Mr Douglass is rather amusing when, after saying, "But say some of Mr. Roberts's stamp who do not go thoroughly into the matter . ." he immediately plunges into a very nice calculation how a nymph may escape a fortnightly dipping, and so far forgets to tell that even with fortnightly spraying a female may become fully fed and drop off on the 12th day, that he goes on to assert that "by spraying every *14th day no mature tick escapes*, and no eggs are laid" And then he goes so thoroughly into the matter that he asserts that it is not necessary to spray the whole beast, "only those parts that the adult ticks infest need be sprayed" I am sure Mr Lounsbury would be glad to learn which the favoured spots are that the adult ticks do not infest I must confess I could not tell him

Perhaps, as he can go so "thoroughly into the matter," he can tell us how the African Coast Fever tick inhabits the ears and body generally of the animal, and how the Blue tick infests the whole body, and is supposed to convey Redwater, and how the Coast Fever tick has a much shorter period on the animal, so that even if his fortnightly spraying were applied over the whole body, the female may still have fallen off to lay, days before the 14th

When a man blames others for want of thoroughness, one naturally expects to find him the very essence of thoroughness himself, and would hardly expect to find him neglecting such very material points, unless he were doing it with the object of misleading the public

Let it be clearly understood, I do not for a minute wish to condemn spraying with paraffin I think it a very useful method for the man who is unable to build a tank Indeed, if dipping were not invented I would be spraying as zealously as ever. I had nearly five years of it, so know something about it And all I can say is it was a most wearisome method Spraying day was always a hard day's work, and there was always that constant watch to be kept that the boys did not scamp a portion of the beast With dipping on the other hand, the work is to collect the cattle from the veld Once that is done, it is as easy as driving them into a kraal It is simply incredible how readily the great brutes take the plunge as if they enjoyed it

As to the effects Well, I do not claim that dipping is absolutely perfect But, by dipping, I find my cattle cleaner than by spraying

Mr Douglass would have the public believe that while about half the nymphs and larvæ escape, the females all escape death from dipping in arsenic This is by no means the case I believe when the report of the experiments here comes out, it will be found that with certain dips all the females not fully fed succumb, and about 70 per cent of the fully fed ones as well Let me explain that by a "fully fed" female is meant one that is replete with blood and ready to fall off, which may happen in a few hours, or at most a day

Now, we will suppose for the sake of argument, that Mr Douglass's fortnightly period between sprayings would catch every female before it dropped It would only be necessary to *dip one or two days earlier* to catch the females before they are fully fed, so as to enable the arsenic to kill every one

Let us examine the chances of a tick starting as a larva (Baby tick) even in fortnightly dippings, as a larva it may be fortunate in getting on the animal at the right time to escape the first dipping Having moulted, it must again be fortunate in getting on to the animal so as to drop off before the next dipping, having moulted as a female adult, it must be fortunate indeed if it again strikes an animal—say seven days after dipping, and then it must just happen on a male that has been on the animal four or five days, so as to enable it to become fully fed by the 14th day, and if fortune has favoured it in all these respects, then it must be indeed have been born under a lucky star if it is one of 20 or 30 per cent which may escape arsenic poisoning.

But this is all theory For *practice*, let me invite Mr Douglass or any one else interested to come and *see the actual result*, and see the ease with which the dipping is manipulated, and I will also shew him how I can fill my tank (3,000 gals) with dip at a cost of £1 17s 6d

A SPORTING CHALLENGE —Mr Douglass claims that after seven years of spraying he has practically exterminated ticks on his farm To enable him to prove this, I challenge him to let his cattle run without spraying, for, say two months, then let the Government Entomologist examine them The result of his examination I think, would be both instructive and useful to us all —Yours, &c ,

LLEWELLYN J ROBERTS.

Cottesbrook, September 19

To the Editor, AGRICULTURAL JOURNAL

In this battle againt the Tick plague it might be well said—Do the one, but do not leave the other undone A man with cattle in a Tick infested region, notes his stock troubled with the pest His is a busy time, labour scarce, and tank far away. Ticks will not wait, let him spray and keep them under Get a spray pump

The first spraying machine that was introduced into South Africa was the Nixon Climax Pump of which Prof MacOwan and Dr Blorsh after exhaustive trials wrote. "*We have* now the thing we want in spray pumps, valves all of brass, indifferent to use either with paraffin soap washes, sulphur or copper salts—a distinct advantage—strong and durable—great force of spray, a tree twenty feet high can be well covered"

If he has one of these pumps he should know that he can add, at a small cost, an ingenious adapter, by which he can easily convert the Climax Pump into one to draw up oil and water at every stroke of the pump, mixing same thoroughly in spraying, delivering with great force (so extended to ensure wetting) and keep the Ticks under, and then if he needs, and opportunity, offers, he can get his cattle dipp at the nearest tank—Do the one, and not leave the other undone

The same idea is strongly emphasised in Spraying *versus* Gas Fumigation for Scale. The latter is not always convenient, so the Scale has its way during the wait. But if the ready sprayer is, (as it should be) to hand, no time need be lost, or Scale increase allowed—and then when labour can be had and tents are to hand let him by all means use the fumigation method—Do the one and not leave the other undone

A most effective wash for scale on trees is one with an addition of two ounces of cyanide to five gallons of the water, part and let the pump mix in one bottle of oil (paraffin) in spraying, quite harmless to the trees— a good killer for the scale and very lasting in its action, after spraying This addition of cyanide to soap wash or oil emulsion is very effective and has been used in locust destruction with good effect —Yours, &c,

W ROL

Graaff-Reinet, Sept 17.

To the Editor, AGRICULTURAL JOURNAL

SIR,—In your September issue I observe two articles on the all important subject of cattle dipping, one by the Hon Arthur Douglass and the other by Mr A W. Douglass, and while these are interesting and bespeak a great amount of thought, at the same time to allow their arguments against dipping to pass uncriticised would, in the interests of South Africa, be a mistake.

The former article dwells chiefly upon the action of recognised cattle dips upon the female Bont Tick The Hon Arthur Douglass boldly and publicly asserts that it is admitted by everyone with experience that no dip has been discovered that will kill the adult female Bont Tick, but that paraffin sprayed upon the cattle has the effect of instantly killing this particular tick

The second article, by Mr A W Douglass, refers more to the comparison of cost between spraying with paraffin and dipping with the present recognised cattle dips

With regard to the former statement, I am quite prepared to admit that the ordinary powder sheep dip is not satisfactory for the entire destruction of the ticks, the young and male ticks may, and do, succumb to the effect of the arsenic but when one speaks of powder dip, it should not be inferred that this includes special cattle dip prepared for the purpose "Quibell's" Paste Cattle Dip is, I am afraid not sufficiently known in the Cape Colony, its composition is such that it absolutely destroys the young and male ticks, and at the same time its effect upon the female tick is equally destructive, inasmuch as the protoplasm of which this particular tick is made up is *coagulated*, which means that it cannot survive "Quibell's" Paste Cattle Dip is so extensively used, and with such excellent results, that, instead of dipping being disparagingly spoken of, and considered a failure it is just the reverse Many of the most progressive farmers to day look upon cattle dipping as being in its initiative stage, and to improve the condition of their stock and to minimise the risk of disease, they strongly advocate dipping

While I do not support the policy of spraying, particularly when there is plenty of water, and the farmer has a large number of cattle, for the simple reason that the risk of not killing the ticks is far greater through ticks sheltering themselves behind the hair, at the same time when water is scarce and stock few, spraying might be accepted, and paraffin, in a case of this sort, could be used, but not where hundreds of cattle are concerned

Looking at the question from a commercial aspect it is certainly very much cheaper to *dip* cattle, the cost ought not to exceed 1d per head The first cost, viz, the erection of the tank, has, of course, to be considered, but when we remember that with a tank, farmers can not only dip their cattle but also their sheep, goats, and horses, it is obvious to all that dipping is decidedly the most economical course to adopt

Mr A W. Douglass states that the building of dipping tanks is on the decline and here again I differ from him As I have just stated, cattle dipping is practically in its infancy, and stock owners in the various South African States are learning the great benefit to be derived from dipping, and consequently building their own tanks

Probably some of your readers may look upon my reply to these articles as a desire to bring "Quibell's" more forcibly before the Colony, but my motive in commenting upon or criticising the articles is to show that dipping is practically essential and will yet become the great medium whereby stock farming can be carried on successfully, or, in other words, with a minimum of risk

I have many letters in my office from progressive men resident in various parts of South Africa, who write in most emphatic terms in praise of dipping Sicknesses common to cattle, such as redwater, etc, have been considerably reduced, and the general health of the stock greatly improved

I feel sure that both the Hon Arthur Douglass and Mr A W Douglass, when writing to you, were actuated by the purest motives, they consider spraying with paraffin all that is necessary, while the experiences of hundreds of others support the policy of dipping and I sincerely trust that stock-owners who are resident in tick-infested areas, will not rest until they, one and all, are in possession of their own tanks and by regular dipping not only eradicate the tick, but keep their stock free from diseases prevalent in the Colony

There is appearing in the September issue of the *Natal Agricultural Journal* a most interesting speech by the President of the Zululand Farmers' Association on this all important question of dipping, of which, through the courtesy of the Editor, I have been able to procure a copy, and have pleasure in handing you same, which I trust, in the interests of all your Cape Colony farmers, you will be able to reprint in your widely read *Journal* as it certainly contains most valuable information.—Yours, etc,

Maritzburg, September 16. CHAS. W HOLMES

To the Editor, AGRICULTURAL JOURNAL

Sir,—In your September issue I notice two short articles entitled "Spraying *vs.* Dipping" written, the one by the Hon Arthur Douglass, the other by his son Mr A. W Douglass. Had the authors confined themselves to a criticism of Mr L J. Roberts's previous paper, I should have been glad to leave the reply in that gentleman's capable hands, but, with the authors, I feel "considerable harm to the cause of tick eradication" may be done "by publishing surmises as ascertained facts."

The object of the papers is to advocate the use of spraying and spray pumps for the destruction of ticks on cattle, but as you truly remark in your "Notes," "Our interest in the question reduces itself to that of tick eradication." That Mr Douglass has not been successful in this task by means of spraying is clearly shewn by the admitted fact that after seven years' work, his farm is still tick infested. The story of the tick infested bush back can only raise a smile. Mr Douglass's admission that he only sprays certain parts of his animals is sufficient to condemn his method.

Mr Douglass's complaint against dipping consists of his unsupported statements, that it will not kill the female Bont tick, and that it will not protect a beast from a larva or nymph tick for a few days after dipping. Supposing these statements were true, his calculation as to the possibility of eradicating ticks from a farm by fortnightly dippings is quite incorrect. Let him calculate by the method of "Probabilities" the chances that a certain tick has of escaping a dipping during the course of its existence and he will find it infinitesimal. (I think it very doubtful that under ordinary conditions on the veld, the Bont ticks remain so short a time on a beast as Mr Douglass quoted. Perhaps Mr Lounsbury would favour us with his opinion on this point.)

But his statements are not correct. The greater proportion of female Bont ticks are killed by dipping in Cooper's Dip, and of those that do not die, none lay fertile eggs. These are facts that are easily proved by Mr Douglass himself if he would take the trouble to investigate. To anyone who understands the composition of Cooper's Dip, the remark "That even if used to strengths that did serious injury to the cattle, it was still harmless to the mature Bont ticks," can only prove amusing, and an evidence of Mr Douglass's incorrect observation. The continually increasing use of the dip in this Colony for tick destruction is a sufficient answer to the charge. Should this not convince Mr Douglass I can only again invite him, as I have already done personally, to come and inspect the cattle I am experimenting upon here, and I will undertake to convert him to the contrary opinion.

As to the relative merits of Spraying and Dipping, we all have our own opinions, time alone can prove which is correct. The farmers of South Africa are not fools, they may make mistakes, but ultimately they will choose the right path, and all the most progressive men are leaving spraying for dipping. I should like to have a list of those dipping baths which, according to Mr A W Douglass 'are now lying idle."

For the farmer with a few head of stock, and living far from a dipping tank, spraying will undoubtedly prove of great help, but I am certain he will never completely eradidate ticks from his farm, and Mr Douglass's experience confirms me in the belief.

Tick eradication is of importance to the whole of South Africa. We all wish to learn the truth, our personal prejudices are nothing. For these reasons I would ask Mr Douglass to make enquiries of his fellow farmers either in Cape Colony or Natal, and he will receive universal testimony to the value of dipping, if not of spraying.

In reference to the invitation to your readers, to give results so far obtained in tick eradication, I may say that I have been dipping the cattle at Gonubie Park in Cooper's Sheep Dip every fourteen days for the past four months. The strength I have so far found most effective is 1½ times the sheep strength, viz., 3 packets of dip to 50 gallons of water, this without the slighest injury to cattle or the death of a single animal. Since the second dipping I have not seen a single mature Blue tick on the cattle and the Bont ticks have rapidly decreased in number. This result has, of course, been obtained in the winter, and the full value cannot be shewn until next season. All the animals have greatly improved in health and appearance through dipping.—Yours etc

SIDNEY WILLIAMSON.

Gonubie Park, East London, September 14th, 1905.

To the Editor, AGRICULTURAL JOURNAL.

Sir,—I have read with disgust the letters of Messrs. Douglass on "Spraying *vs*· Dipping·" The only thing they can find to say against dipping is that it does not kill the female Bont tick. Even if we admit we can't kill them when gorged, we have every opportunity of doing so when they are in the larvæ and nymph stage, and before they are gorged. The whole of Messrs. Douglass's crusade seems to be against the Bont tick. Is it not just as important to eradicate the blue and brown varieties? Do the Messrs. Douglass not know that the blue tick is responsible for Redwater, and the brown for Coast Fever? Do they not know that hundreds of cattle die every winter from what Natives call "Isilwai!" which I believe is the blue tick in its nymph stage, and which, as Messrs. Douglass confine their spraying to the under parts, they can never eradicate, as these swarm in millions all over the beast. We want to eradicate all ticks, and to do this you must not confine your operations to the under parts only. The Messrs. Douglass can hardly claim to have cleared their farm since one of them found fifteen pairs of bont ticks on one mangy patch on a bush buck. Judging from this, I should say they were just about where they started seven long years ago. The Messrs. Douglass are not the only people who have tried spraying, most farmers have, and they know you can't spray a beast thoroughly with less than 1½ gallons, as so much misses its mark and gets blown away by the wind. This according to the Douglass calculation, would cost about nine-pence per head, and you can dip at a cost of a penny per head, and as Mr. Roberts says your cattle will be cleaner than after spraying. Supposing we only catch a third of the ticks on dipping day, since they have to find a host three times before they arrive at maturity, they stand but a very poor chance of escaping altogether, certainly not so good a chance as when hidden by the folds of the skin between front and hind legs when Messrs. Douglass come along with their spray pumps to eradicate ticks by spraying the under part only.

Let Messrs Douglass come up here and see how beautifully clean and sleek our cattle are, and if then they do not go home and build a dip, well then, Mr Editor, their friends had better—send them to Grahamstown

Clean your farm by spraying under parts for seven years at a cost of 16s 3d. per 100 and after all that find fifteen pairs on a mangy patch, and still advocate spraying as against dipping. Gad! Mr. Editor, I hardly think their friends need wait.

I have seen the Grahamstown tank The entrance crush falls about one in ten to the dip This should be just the reverse, they should also have a foot bath in the race kept full by a boy at the pumps. After a good rain, or the dipping of a couple of thousand head of cattle, the contents of their tank must be of the consistency of gruel,—Yours &c.,

ALLAN PAGE.

Gold Dust,
Komgha, Sept 7th, 1905.

Successful Spraying at Coega.

To the Editor, AGRICULTURAL JOURNAL.

Sir,—Allow me to add my testimony in favour of spraying cattle in preference to dipping for ticks.

When I first took over the management of this farm, some three years ago, the ticks were in greater numbers than I had ever before seen. Heifers coming up with first calf were minus one, two, three and sometimes all four teats; whilst I was continually called upon to lance abscesses formed by clusters of ticks.

It was some months before I could persuade my employer that spraying with Parafine and Water mechanically mixed in a patent pump, was the best method of combating this pest. For the first six summer months I sprayed every Saturday and from that time up to the present I have sprayed every fortnight without missing. The result is that for the last twelve months ticks have been conspicuous by their absence. And all heifers calving this year have without exception all four teats sound Although it would be absurd to state that the farm is free from ticks, yet they are so considerably reduced as to make cattle farming a profitable pleasure, and the cattle with their clean udders and stomachs are the wonder of all that see them.

I mention the above to show that the eight years mentioned in Mr. Roberts's report, is a very outside limit. My experience is that two or three years of systematic spraying is sufficient to so reduce ticks that they cease to be a pest. I also disagree with

Mr. Roberts's estimate of the amount of Parafine required. I find that the amount used in actual practice is little more than half that stated by Mr. Roberts.

As regards time, I take slightly under three hours, working with three boys, to thoroughly spray 150 head of mixed cattle.

One point seems to have been overlooked by both Messrs. Douglass & Co., and Mr. Roberts, viz :—

That it is far easier to persuade the average farmer to give spraying a trial than to persuade him to build a dipping tank.

I take it that all progressive farmers, wish, for their own sakes. to persuade their neighbours to make some effort to eradicate ticks. If your neighbour is a poor man, what chance have you of persuading that man to go to the expense of building a dipping tank? and the subsequent expense of filling it; (with every possibility of arsenical poisoning when such dangerous dips are used by some uneducated and ignorant people) Whereas the poorest farmer could run to the expense of a spray pump; which could be used without any possibility of danger I have never known any inconvenience caused to cattle when 25 per cent parafine and 75 per cent., water is used.

I notice that one well advertised and popular cattle dip, state in their circulars that they guarantee to kill 60 per cent, of ticks. I guarantee that parafine and water spray kills 100 per cent —Yours &c

CHAS J VEITCH.

Tankatara, Coega,

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Acute Indigestion in Calves.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have been greatly troubled with diseases among my calves, and have tried various remedies, but with very little success I have already lost ten calves Most of them take sick, dwindle away, and eventually die.

They do not run out. They suck on their mothers, then I feed them on green barley, and I also used to give them the separated milk I could never find out the least cause of their death On examination, I put it down to the separated milk. Has that anything to do with it? Well, since I stopped giving them the milk, I did not lose a calf for some time, till this one died, that I send you the enclosed paper about, and would like you to let me know the cause of its death, etc.

Since it took sick I dosed it first with Cattle-salts, 4 oz. to a bottle of water, then I tried vinegar and gunpowder, then sweet oil; and, last, to keep its bowels open, I gave it some Raw Linseed Oil every other day The last week it would not suck or eat, so I fed it by means of a bottle on four bottles of pure milk and two bottles of gruel (with a little common salt added) per day at different times

The symptoms on *post-mortem* of the calf were as under —All foodstuff in the stomachs and intestines smelt bad. The inside skin of all the stomachs peeled off at the least touch as if putrified. The leaf stomach had very little food in but was moist. The kidneys were black on the outside all round, the gall bladder rather large, the bile very dark and thick, having the consistency of treacle, with some mucous matter. Liver somewhat congested Lungs, two smaller lobes very dark, almost black, having some mucus matter in the tubes The large lobe of a very light colour as if scalded. Heart rather large, a very small quantity of fluid in heart-bag. Full of congealed blood, but no other sign of inflammation The lower left jaw-bone enlarged; on examination found to be completely rotted off. Had small bits of stones in the wound, which were worn smooth and round

One of my cows has also just died. All I noticed yesterday morning was that it got up very slowly. But as I am troubled with stiff-sickness, I put it down to that. At dinner it was lying down, and in the afternoon I tried to pick it up, but I could not do so. I gave it some barley, and dosed it with a tablespoonful of Little's Fluid to a bottle of water, thinking it might have redwater. At 10 p.m. I went to have a look a it and found it was dying. On examination, to which I had two of my neighbours, this morning, all we could find wrong was that it had severe inflammation of the lungs and of the intestines, and a little fluid in the heart-bag Everything else was normal. We could come to no conclusion as to the cause of its sudden death.

Could you or the Chief Veterinary Surgeon give me any light on the subject?—Yours, &c.,

PERPLEXED.

Macleantown, Sept. 4th, 1905.

It is very difficult, from this description, to give a definite opinion respecting the cause of the death of the calves. The description of the *post-mortem* appearances points to acute indigestion, but that may have arisen from the over-generous treatment —forcing milk and gruel upon the stomach—when that organ was unable to digest it. But what puzzles me most is, that "Perplexed" does not refer to the condition of the bowels or the character of the fœces discharged. Indigestion in calves is invariably accompanied by diarrhœa, but "Perplexed" does not refer to its presence. With regard to treatment, "Perplexed" did quite right to administer a dose of Epsom Salts as soon as the calf appeared sick and off its food. I am of opinion that if he had given 10 grains of Calomel first, and, after 8 to 10 hours, given the salts, it would have been better, but under no circumstances is it good treatment to force bottles of milk and gruel on a calf which has no appetite It is not digested and fermentation and other decomposing changes take place in it, producing the conditions of the food and stomachs which he describes. A very little thin-strained barley gruel should be given until the stomach resumes its function.

With respect to separated milk, I understand from "Perplexed's" letter that his calves are allowed to suck the cows, but get the separated milk as an extra—possibly irregularly. Calves can be successfully reared on separated milk, after they are a fortnight old, provided that some linseed jelly is added as a substitute for the cream which is removed. This linseed jelly is made by boiling, or simmering slowly, whole linseed in six times its bulk of water, over a slow fire, until it becomes a thick jelly. After the calf is about a month old and capable of digesting solid food, it should be supplied with some grass hay, lucerne, green barley, or similar fodder, and mealie meal may be added to the linseed meal jelly. The principal things to attend to in feeding calves by hand is to see that all the utensils used are kept scrupulously clean, and that no calf is allowed to drink too much. Unless separated milk is given to the calf as soon as it passes through the separator, it should be warmed to about 70° Fah. With respect to wound in the left branch of the lower jaw, that must have been caused by some severe external injury, and must have existed for some time according to "Perplexed's" description. The wound should have been carefully cleaned out, and all caried portions of bone removed and kept clean I wonder the attendant did not notice it I do not think, however, that it was the principal cause of death.

With respect to the cow. I cannot give a definite opinion as to the cause of her sudden death The acute inflammation of the lungs may have been caused by a mistake in administering the solution of Little's fluid. The inflammation of the intestines points to some irritant eaten. It could not be either ordinary Stijfziekte, Lamziekte, Redwater, or Lungsickness.—D. HUTCHEON, C.V.S.

Mr. W. R. Southey's Opinion of Cooper's Dip.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Messrs. Cooper are now playing what I suppose they consider their trump card by publishing very conspicuously my name in connection with a testimonial I gave them in 1893. I have not gone out of my way to run down any one particular dip, while advocating lime and sulphur which from experience I have found the safest and surest way of eradicating scab.

I might, had I wished to damage Messrs. Cooper, have published a serious loss I sustained in dipping with Cooper's. Some years ago I had occasion to dip 80 very valuable rams in *Cooper's Powder Dip*. It was a fine day, with a few thunder clouds hovering about After dipping, the flock was sent to an out-station two miles distant and was caught in a shower of rain. The rams started dying the following day, and within six months what were not dead had their constitutions ruined. I lost the whole flock, not selling one.

Will you kindly publish this together with my letter to Coopers' of the 27th July, 1899.—Yours, &c.,

W. R. SOUTHEY.

Varken's Kop, August, 1905.

The following is the letter mentioned by Mr. Southey, which was addressed to the *Midland News*:—

SIR,—Will you allow me to say in reply to Messrs. W. Cooper and Nephews that I have not contradicted my testimonial given years ago. Neither have I brought any charge against their dips.

What I say is these imported dips are a mystery, whereas in former years we were successful in curing scab, we have in later years had to give it up in disgust, and fall back to lime and sulphur As to their generous offer If Messrs W Cooper and Nephews are so anxious to distribute money for charitable purposes they are quite at liberty to do so, as there is no necessity for it first passing through my hands I will now mention some facts as to why there is a mystery, and why we have lost faith and come to the conclusion that imported dips are not of uniform strength On one occasion I had arranged to take some sheep to the East London Show A few days before starting some spots of scab were found on these sheep. I at once had them thoroughly dipped in Cooper's Dip Imagine my surprise when I was informed by the Scab Inspector on the show ground that living scab was found on these sheep The sheep were placed in quarantine, and I was hauled before the Magistrate, naturally I made the best defence I could, my contention being that the sheep must have been re infected on their way down to the show in the Government trucks, and that instead of being fined, I should be entitled to damages But the Magistrate did not quite see it I was however let off with a fine of *one shilling*, the Magistrate remarking it was very evident the sheep had been thoroughly dipped, as they were still quite yellow down to the skin from the dipping On another occasion I was informed by a farmer that his lambs were badly infested with tape worm I recommended a mixture of Cooper's Dip and salt—1 oz dip to 12 of salt, giving full directions how it was to be used, and cautioning to be careful in dosing a small number first and watch the result, and dosing the large number a day or two after on meeting this farmer again I was told he had carried out my directions to the letter Out of the smaller lot dosed at first he had no loss but after dosing the larger number next day he had lost a very large percentage On enquiring how he accounted for the loss I was told, the only conclusion he could come to was, that the dip he used was not of equal strength, he having used dips from another packet for the second dosing, and the packets were not of a uniform colour

Now as to our own experience of late We always dipped in Cooper's, but somehow we could not keep our sheep clean more than a few months, when scab would make its appearance again, and in they would go into the dip again But only a few months would pass when there was the scab again Having such faith in Cooper's we would have it that the sheep were re infected in some mysterious way, although we could not in any way account for re infection Being determined that the scab should be mastered, the sheep were dipped in Cooper's, every precaution being taken that the directions should be fully attended to A clock placed in the wall (as is usual) and the sheep timed to remain in the dip a full three minutes, this was repeated within fourteen days About ten days after the second dipping, the flock was carefully examined, when to our surprise they were found not cured spots of living scab were found under the belly between the hind legs, and also between the forelegs This naturally solved the mystery as to re infection Naturally we have lost faith and fallen back on lime and sulphur, which we are finding most beneficial

After such experiences as these we must leave it to Messrs W. Cooper and Nephews to solve the mystery further

Apologising for space —Yours &c,

W R SOUTHEY

Varken's Kop, 17th July, 1899

Lime and Sulphur and other Dips

To the Editor, AGRICULTURAL JOURNAL

SIR,—With regard to Mr Southey's request that all who have dipped with Lime and Sulphur should publish their experiences, I may say that if Lime and Sulphur also had a paid agency much more use would be made of it "No man should quarrel with his bread and butter" Well, Sir, my experience is that if Lime and Sulphur is used according to Mr. Southey's prescription, it will surely cure any Scab. It will also improve the wool and the sheep, it strengthens the wool staple and makes the wool grow much denser and longer Last year I dipped with Lime and Sulphur 4 months after shearing In October last, I sheared the sheep, the wool is strong and did not break In November, 1904, I dipped again with Lime and Sulphur, and now my sheep are perfectly cured and the wool is splendid My neighbours have now all dipped with Lime and Sulphur, and all speak highly of it. With regard to other Dips, if McDougall's Dip is the same as 25 years ago, it is surely the best dip in winter Then it was contained in wooden kegs In using it, dissolve it in water and apply while foaming on the wool

It also seems that scab will not be so easily eradicated as long as fences and gates are not made reliable With the removal of the sheep to other grazing ground the sheep were clean There they got mixed with others and as soon as they felt inclined they turned back to the farm whence they came, taking the infection from sheep by the road and also trek sheep The farmer who has a private gate on his farm may consider himself safe against Scab The poor farmer whose gates belong to the public road must always be afraid of re infection —Yours &c

M J LA GRANGE.

Middelplaats, Riversdale,
15th August, 1905

Lice on Cattle, Stijfziekte, &c

To the Editor AGRICULTURAL JOURNAL

SIR —Can you inform me what would be the best Spray or Dip to use for the destruction of lice on cattle ?

I have noticed for some time that some of my cows are constantly licking themselves, though there appeared to be very few ticks on them I could not think what the cause could be, until, the other day, I caught and examined some of them and found that they were covered with lice which were quite invisible to ordinary observation, and this would probably be the cause of the cows being in such low condition in spite of having the best of grazing

I have also several young cows suffering from Stiff sickness, some for four or five months On the first appearance of the complaint I dosed them regularly with Bone Meal with salt added and have continued to do so and also given it them as a lick, but so far without any good results and latterly I have mixed a little lime with the Bone Meal but instead of improving they are becoming worse The grazing which they have had for the last two months could not be better Could you suggest anything else which might be beneficial ?

The complaint is only among the cows in milk

My riding horse is lame He is rather aged but otherwise sound with the exception of a hard lump which he has inside his hock This lump he had ever since I purchased him about eight years ago, but it never seemed to interfere with him until within the last four months when he commenced to get lame in this leg and in spite of a blister which I applied about three months ago, is still lame and seems to be becoming worse Can you suggest anything ?

I am informed by those who have tried it, that the ordinary Cooper s Dip and Soap Spray does not destroy lice on cattle although effective for ticks —Yours &c

A W

Komgha, Aug 5th, 1905

Lice on cattle can be destroyed by washing with Tobacco water Soak the Tobacco in water overnight in a can at the side of the fire an ounce to two quarts Apply with a brush Another good agent is paraffin emulsion one part paraffin oil and two parts soap and water Stir well and wash animal all over Cooper's Dip and soap may not destroy lice when sprayed on the animal as in that case the mixture will, under certain conditions, fail to penetrate the roots of the hair where the parasites are most numerous but such a mixture if used as a dip or applied with a brush will, as is true of all the arsenical dips, prove fatal to lice It is well to bear in mind that animals cleaned from lice quickly become reinfested from the kraals and sheds which when the animals are treated must also be cleaned and disinfected Burning of litter and the use of hot lime wash or lime wash and carbolic acid and hot water and soda are the best means to employ

For the Stijfziekte, increase the amount of Salt and Bone Meal given daily, in an acute case give three tablespoonfuls Bone Meal, one tablespoonful Salt

In my opinion your horse is affected with a spavin (or a bony growth which interferes with the movements of the hock joint), as you have ineffectually tried the effects of a blister the only agent left is the hot iron *i e.* firing followed by another blister. —W R

Redwater Inoculation.

To the Editor, Agricultural Journal

Sir,—Some two months ago you were kind enough to answer some questions which I put to you about inoculating cattle for Redwater, I shall be much obliged for your further advice and opinion on the following There is a farmer living up here who has most successfully inoculated cattle for many years past and his experience is that if 100 or more centimetres ot blood from a salted beast are put into a raw animal, it is far more likely to "salt" safely than if only a few (say from 2 to 10 c c) are put in In support of the above I may say that about three years ago I inoculated about 20 head of raw cattle and I put from 50 to 120 c c into them All these cattle pulled through, do you not think it possible that by putting large doses of salted blood into raw cattle that you actually put some resistant power into them to fight against the disease ?

If imported cattle were (by dipping and washing) kept perfectly free from ticks and always kept in a shed, do you think that they would still be likely to contract Redwater and if not, what dip or mixture would you recommend ? Yours—&c ,

P E Leonard

Glen Dower, Kokstad

It has been found that it is the quality of the blood not the quantity which is the essential factor of success in Redwater inoculation, and it is believed that the successful results accruing from the inoculation of large doses of salted blood would equally occur if a smaller dose of the same blood were used 2 c c of Redwater blood has been known to cause death and 30 c c of the same blood likewise prove fatal —W R

The Branding of Stock.

To the Editor, Agricultural Journal

Sir,—I notice in the August edition of your esteemed journal, that at the eighth congress of the Agricultural Union of C C, the chairman in a speech on the Branding Act states that it is not necessary to inflict any pain when branding cattle

I am compelled by circumstances to brand my cattle and have been doing so for the last four years, but I find it an unpleasant and troublesome operation If not severely branded, cattle are liable to lose the mark within a year and if severely branded the brand often becomes a rather ugly scar I have been using hot irons

I would be much obliged if you could forward me any instructions or suggestions on the matter—shape of iron, width of edge, material iron should be composed of, age of calf, &c

Is there no other more satisfactory method of branding in use ? The elaborate brands on some Argentine mules and horses hardly look like hot iron branding — Yours &c

Fred Versfeld

Porterville

The most suitable agent for branding is the hot iron used at redness, There are several so called branding caustic mixtures but all the elaborate brands on Argentine stock are made with hot iron Let the design of the brand be big, that is the lines some distance from each other The iron of the brand should be an one-eighth of an inch wide and as remarked above should be used at a red heat Apply firmly and quickly, the disfiguring scars are generally the result of a cool iron held in position for a considerable time, thus destroying large areas of the true skin. Calves can be branded any time after yearlings.—W R

Pine Trees and Orchards.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—*re* letter "Oranges and Pine trees" in September issue, I would kindly beg to differ with you, as I have found Pine roots 75 feet from stem, in my orchard of Prunes and trees 50 feet away suffered greatly

The best is to make a trench deep enough to cut all roots close to pines, you can fill the trench up and reopen every three or four years, it is an expense but pays in the long run —Yours &c.

ROWLAND TAYLOR.

M'Foshola, Wellington, September 4.

Failure of Salt Bush Seed.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Referring to Mr. Joubert's letter (September number) *re* above. I shall, be glad if you will allow me to state that I also obtained Salt Bush Seed from your department. I sowed some of the seed and they came up well. This is proof that the seed is good. - Yours &c.

C. CLEMENTZ.

Colesberg, September 7

Water in the Karroo.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—There has been a great deal of controversy both in the Press and at meetings about that most important question of Irrigation, only second in importance to the labour and education questions.

Water, water, water, precious, indispensable, life giving water, whether from the clouds (the form most welcome and desirable) or from fountains, wells and rivers, is what the agriculturist desires above everything for his farm. Water is what he wants, for what can he do without this precious material? In the more favourable parts, near or at the foot of the mountains, as the Langebergen, Zwartebergen and Drakensbergen the privileged farmer has generally water sufficient for his lands, gardens and livestock; but in the Karroo, where nearly throughout the year, the river-beds, with very few exceptions, are quite dry, and where only here and there a fountain or well is to be found what is to be done there? For everything depends on the rainfall, and as the drought lasts for months, there the poor farmer sits looking despairingly at his poor thirsty animals on which the very life of his family depends and which form his current capital. They grow thin and emaciated and ultimately succumb, for want of food. Thus the farmer's affairs get in a bad way, not through laziness, carelessness or stubbornness, but through want of water, especially rainwater which fails to fall. Recently the clouds gathered from all sides, a beneficial rain was expected, the farmers' hearts rejoiced, as they thought in their simple belief that at last the Lord would give relief, for the clouds looked most promising, and the barren Karroo would soon be transformed into a green flowery field covered with nutritious bushes. But, alas! what happened? Rain commenced to fall on Saturday afternoon and continued throughout the night. The weather was threatening again on the Sunday and Monday following, but it cleared up, and the little rain that fell was just sufficient to lay the dust and the dry Karroo was again as dry as before. Only the Tonqua River came down and the farmers along its banks utilised the water to irrigate their lands. Most probably other parts of the country have been favoured with rain, but this I can assure you, Mr. Editor, the Karroo as dry as ever, and the poor farmers trek about looking everywhere for pasture which they cannot find, the few farmers who still possess good veld keeping it for their own stock. Unfortunately the Karroo Rivers do not spring from perennial fountains in the hills, but most of them have their origin in vleys which almost completely dry up, They only rise during thunderstorms and rains, but after a few days fall again Moreover the Tonqua like other Karroo rivers has banks so deep and steep that the water cannot be utilised for irrigation purposes Some farmers have sunk wells in the river and use Norias or Bakjespompen for their lands and gardens

I think the only expedient for Karroo farmers is to use wells or bore-holes (Artesian Wells) and to erect windmill pumps on them There is plenty of underground water, and one need not dig far or sink the bore hole very deep to get a good stream of fresh water But Government should assist farmers with the necessary funds on the £ for £ principle. This Tonqua Valley and many more in the Karroo may be transformed into magnificent fields and grounds if there are only perennial streams of water *Water is the great problem* —Yours, &c

DAVID H DE VILLIERS

Karroo, Aug. 22nd, 1905

Since the above was written good rains have fallen generally.

Blauwkam in Fowls

To the Editor, AGRICULTURAL JOURNAL.

Sir,—I beg to give you a remedy for Blauwkam in Fowls, which I trust you will kindly publish in your *Journal* If this remedy is regularly applied every month then fowls will never suffer from Blauwkam, and it becomes a preventive

Take a teaspoonful of Little's or as we call it Bok Dip, mix in four bottles of fresh water, soak the fowls' food in the mixture during the night, and give it the next morning (Four bottles Little's dip mixture will be sufficient for half a bucket of mealies or barley) The fowls do not take very kindly to it but still they pick up some of it, the remainder is removed to get dry and in this condition they eat it with more relish —Yours, &c,

J S MARAIS

Wakkerstroom, Robertson.

Blauwkam or Chicken Cholera is a specific disease due to a special micro organism, the character of which is now well known It is difficult, however, to understand how a dose of Little's dip given only once a month would act as a continuous preventive of such a disease, assuming that the disease producing organisms are always present It is good practice to use an antiseptic, when disease appears, to arrest the spread, but some effort should in all cases be immediately made to get rid of the infective agents by a good cleaning up, and a thorough disinfection of the poultry runs, houses, etc —D H.

Dam Scoops

To the Editor, AGRICULTURAL JOURNAL

Sir,— So many different opinions exist as to the best Dam Scoop to use with or without wheels What is the opinion of the department?

I think the wheeled scoop is a whiteman's implement whereas the other suits a Kaffir —Yours, &c,

J D M

Post Retief, September, 12th

"The Department," like other sensible people has a very definite opinion on such subjects The best scoop is the one that does the work best For some work, wheel scoops are most suited, for others those without It is entirely a question of the character of the work to be done The wise man is he who adapts his tools to his work.

Extra-tropical Forestry.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—With reference to your correspondent's (A E H) letter in the September number of the *Agricultural Journal*, it is not to be understood that Bechuanaland is too dry for the planting of many beautiful and profitable trees, but that timber cannot be produced so economically as further east, where there is a heavier rainfall The Lichtenburg plantation across the Transvaal Border is intended to assist general tree planting in dry country, not to produce timber economically on a large scale I hope before long to have an opportunity of visiting the plantation site mentioned along the banks of the Malopo River

Eucalyptus microtheca and Elm (*Ulmus campestris*) are both suitable for planting in Bechuanaland in localities where there is subsoil moisture The Blue gum (*Eucalyptus globulus*) is out of place anywhere in Bechuanaland, though no doubt, it will grow for a number of years in localities where there is abundant subsoil moisture The locality mentioned by me near Vryburg was one of these It will be seen from what I have written elsewhere that I deprecate, in every way, the planting of Blue-gum in dry climates such as Bechuanaland The Blue-gum is a climatic exotic in such localities, and, after exhausting all the water around will be liable to die off during droughts In such localities the Blue-gum makes enormous demands on water and subsoil moisture Instead of Blue gum there should be planted the Eucalypts suited to dry countries, of which the following may be mentioned Most of these can be seen flourishing in Mr J. D Logan's plantations at Matjesfontein and Tweedside —

Eucalpytus polyanthemos	Den Very hardy against drought and frost
,, *leucoxylon*	There is a fine avenue of these at Tweedside
,, *corynocalyx*	Stands the frost of Majesfontein, but not the more severe frosts of Orangia
,, *salmonophloia* ,, *salubris*	Coolgardie Gums These will stand extreme drought and moderate frost *E salmonophloia* is a graceful, slender gum with orange coloured flowers
,, *sideroxylon* ,, *crebra*	Two inland Ironbarks first rate timber, drought and frost resisting

Yours, etc

D E HUTCHINS

Cape Town, September 21, 1905

Extracting Stones from Bore-holes

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Can any readers of your widely circulated *Journal* inform me, through the medium of its columns, the best means of extracting small stones from a 2 in bore-hole ? The stones are just large enough to jam the hole, but do not prevent the flow of water, except that the quantity of water from same has to a large extent diminished, naturally caused by the stones The stones have been thrown in from the surface

The hole is a 2-in one, and 20 feet deep, the jam is about four feet from the surface There are other stones further down, which would also require extracting I may mention, however, that the water rises and flows of its own accord, and is not brought to the surface by the aid of a pump of any kind Any information which will lead to the cleaning of this hole will be most valuable —Yours, &c ,

W. McDONALD.

Tyldendale, Queenstown, September 14, 1905

Heavy Mortality in Lambs

To the Editor, AGRICULTURAL JOURNAL

SIR,—I would be very glad if you could tell me of what disease I am losing all my lambs I have about 700 ewes (Merino), many of which have thrown dead lambs and those which have apparently healthy lambs, live for two or three weeks and then die I have lost over 400 in this way

Could scab be answerable for this, as scab broke out at the beginning of the winter, and spread very rapidly amongst my flock? I am waiting for the warm months before I dip as my sheep are very poor

Last year my sheep were running on different veld and I had a splendid lot of lambs Could it be poison? Is Stockholm tar a good thing for worms in lambs?

The symptoms of the disease from which I am losing my lambs are as follows The liver in all cases is a very unhealthy colour—a deep purplish blue—the kidneys are also the same, and the heart is also affected, and the lung in almost all cases is bad They are not dying from starvation as the ewes have plenty of milk and my lambs are in good condition They are dying at the rate of ten per diem. My veld is a bush veld, and there is plenty of food for the sheep

In a few cases on opening the animal there is a lot of yellow water —Yours, etc ,

L GORDON MAYERS

Kuruman, Aug 24

It is impossible for me to say what Mr Gordon Mayers lambs are dying from. " Heart water " has not got to Bechuanaland, so far as I am aware and the lambs are said to be in *good* condition, so they can hardly be suffering from worms The ewes are also said to have plenty of milk, and get plenty of food, although they are described as being very poor There must be something wrong in the first place to cause so many ewes to throw off dead lambs, and the fact of a lot of fluid being found in these lambs when opened, would point to a dropsical condition arising from want of proper nourishment—or anæmia Stockholm tar, administered once a week or so, a teaspoonful at a time, is beneficial for lambs – D. H

RURAL REPORTS.

For the month ending 15th September, 1905.

Bedford.--Weather is seasonable, very windy, with severe frosts at times Rainfall has been about the average and better than last year at this time Karroo and bushes look well, but grass is backward, and locusts in immense swarms devour the grass as it shoots Lucerne is springing up very nicely, but we do not expect to cut much hay, as farmers are grazing the green stuff to keep poor animals alive Cows are still in low condition, and there are very few calves owing to last year s drought. Slaughter animals are scarce and not in first class order Lambs in splendid condition, but ewes commencing to lose condition, as on account of ravages of locusts they can find no pasturage Slaughter stock are in good order and fairly plentiful Goats doing well, kidding good, so far Ostriches are all in good order, and a good number of chicks are expected, as birds are laying a lot Jackals giving trouble as usual

Clanwilliam.—East winds are rather severe this year Weather hot and dry. Little rain has fallen, considering which, veld is in fair condition More rain is badly needed Crops are not doing as well as last year Cattle are in fair condition and healthy. Calving season has been very good Slaughter stock are also in fairly good condition and realising satisfactory prices Horses, mules, etc, are in good condition for this time of year Good draught animals scarce, prices £40 to £96 per pair Mules plentiful Sheep and goats are doing well, and there is very little scab in the district Ostriches fair Pigs are doing well

Mafeking—Rainfall this month has been light, but earlier than usual. Weather cold and windy lately after a spell of hot weather Veld is in very dry condition Away from watering places it is not so bad, but as these are now few and far between, stock are concentrated at these places Fruit trees are blossoming freely and there are prospects of a good season The condition of cattle is a slight improvement on what it was last month Horses, mules, and donkeys are in good condition Sheep are doing poorly, as they are lambing and veld is dry Goats poor.

Oudtshoorn.—Rain has fallen heavily in most parts of this district, and veld, which is for the most part very dry, may now be expected to improve Weather fair, at present, windy in earlier part of the month Wheat and oat crops, and lucerne, where sown, looking well Fruit promising, only disease being red scale Stock of all descriptions are in good, healthy condition Prices fair.

Queenstown.—Weather here very cold during parts of the month High winds prevailing The rainfall has been light, but above the average, and the best for years. Veld is in very fair condition, and will grow nicely as soon as the warm weather sets in A great deal of oats has been sown, and is doing well since rain fell. Lucerne is also going on nicely Cattle are in very fair condition considering the time of the year Working oxen in rather low condition Horses are not doing very well. Prices high Sheep in good condition Lambing beginning

Riversdale –Rainfall for the past month above the average Veld improving in condition Weather cold and frosty Fully two-thirds more wheat has been sown this season than last year, and promises well Good sowings of oats have also taken place Fruit trees are commencing to blossom and look well Cattle and live stock of all descriptions are doing well and improving in condition. There is practically no scab here, and lambing has been good on the whole.

Robertson.—Our veld is not looking quite so good as usual at this time. Average rains have fallen. Weather at present is rather cool. The young wheat and oat crops are looking well. Barley also good. Lucerne beginning to grow nicely. Live-stock of all descriptions in good condition, and doing well.

Somerset East.—During the latter end of last month and early part of this month high northerly winds prevailed and the weather was changeable. Rainfall for last month was 1·51 inches; but glorious rains have been falling for the past five days with every prospect of a continuance. A large quantity of seed has been sown and the young crops look most promising. Lambing and kidding has been very fair. Ostriches are doing well. Cattle are rapidly improving in condition and are free from disease. No damage by locusts has been reported. Agricultural conditions generally justify the hope of a complete recovery from the effects of recent severe droughts, and farmers are jubilant.

THE TRANSKEI.

For month ending 31st August, 1905.

Bizana.—Strong westerly winds have prevailed during the month, with little or no rain. The harvest has been gathered in, and is much above the average of the last few years The price of grain ranging from 5s. to 10s per muid. Stock of all kinds are in good condition and free of disease.

Cofimvaba.—The indications of an early spring, referred to in my last report, still continue, and with the few showers of rain during the month, the work of ploughing has been found possible in most parts of the district. No diseases of a serious nature amongst stock have been reported during the past month, and all animals appear in fair condition.

Flagstaff.—The harvest was much better than anticipated, and grain has been plentiful Mealies are only realizing from 7s to 10s. per bag. The past winter has been very mild, and stock are in good condition. The pasturage is excellent for this time of year. There is a case of reported glanders, and I am expecting the veterinary surgeon to come and apply the Mallein Test, with this exception the district may be said to be free from disease.

Kentani.—I have nothing to report. Spring rains have not yet fallen, and agriculture is at a stand-still. Pasturage is good and plentiful.

Kokstad.—The weather during the past month has been dry. High winds were experienced on most days. The veld is very poor owing to the severe frosts. Cattle doing fairly well and free from disease, with a promising calving season. Horses in most parts of the district are in good condition. Small stock in good condition, hardly any scab.

Libode.—Several nice rains fell during the past month, and the pasturage is in very fair condition. Some of the natives have begun to plough, and there is every indication of a good season. Stock, both large and small, are in good condition, and no diseases have been reported.

Matatiele—A severe drought prevailed during the whole of the past month; as a consequence the veld has become thoroughly parched up, and cattle are getting into very low condition. The temperature has been quite above normal for this time of the year, and fruit and other trees have come into bloom. The district is badly in need of a nice warm rain which would immediately change the whole condition of the country and enable the farmers and natives to commence ploughing The district is entirely clear of animal disease of an infectious or contagious nature

Nqamakwe—The weather during the past month was dry and cold, with high south-westerly winds. The total rainfall registered was only 0 86 of an inch. The natives in many parts of the district have taken advantage of the heavy rains which fell during May and June to sow wheat and oats, which look very well Outbreaks of lungsickness and anthrax in cattle have been reported from several localities

Tabankulu—The past month has been very dry, and, with the exception of a heavy fall of snow on one occasion during the last month, there have been only one or two slight showers of rain. Stock of all kinds are in fairly good condition, and have not suffered much from the protracted drought The rainy season is now over, and the harvest has proved much larger than was expected Natives are still bringing in grain to the stores for sale, and are receiving from five to six shillings a bag for mealies and 7s 6d a bag for Kaffir Corn These comparatively low prices are a sure indication of the abundant yield

Tsolo.—The winter has, on the whole, been an exceptionally mild one, with the result that the veld has kept in fair condition throughout Thunderstorm showers have already commenced and augur well for a good season Ploughing has been commenced in many parts of the district Stock are in very fair condition, and no contagious diseases have been reported the past month

Umtata.—There is nothing of note to report for the past month The winter has been exceptionally mild, and there is every prospect of an early spring Stock is in good condition, and ploughing has begun in many parts of the district.

NOTES ON THE WEATHER OF AUGUST, 1905.

By Charles M. Stewart, B.Sc., Secretary to the Meteorological Commission

The leading features of the weather of last month as compared with the normal were unusually high mean pressure exceptionally low mean temperatures with frequent and occasionally severe frosts an increase in the number of thunderstorms, skies more clouded than usual, comparative few and local fogs, a rainfall about one-sixth less than usual and occasional falls of snow and sleet

Precipitation —The mean rainfall during August, as shewn by the returns from 329 stations, amounted to 1·30 ins. on 5 days, being 0·26 in or 17 per cent less than the average Rainfall above the average was limited to four sections, viz., Orange River Colony, South East, East Central Karroo and the South-West, the excess being greatest (52 per cent) over the first, and least (4 per cent) over the last Absolute drought prevailed during the month over Bechuanaland, Rhodesia and the greater part of the Northern Border, while the deficiency over the remainder of the Divisions varied from 69 per cent in Basutoland to 9 per cent over the West Coast

Division.	Mean Rainfall (1905).	Mean No of Days	Average Rainfall (1894 1903)	Average No. of Days	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches		Inches		Inches	Per cent.
Cape Peninsula ..	3·99	13	5·36	12	— 1·73	— 34
South-West ..	3·21	8	3·10	8	+ 0·11	+ 4
West Coast ..	1·20	5	1·31	5	— 0·11	— 9
South Coast ..	2·12	9	2·44	7	,, 0·32	,, 15
Southern Karroo ..	74	4	88	3	,, 0·14	,, 16
West Central Karroo ..	·35	3	·50	2	,, 0·15	,, 30
East Central Karroo ..	72	4	·62	2	+ 0·10	+ 16
Northern Karroo ..	31	2	35	2	— 0·04	— 13
Northern Border ..	·01	1	·16	1	,, 0·15	,, 94
South-East ..	1·63	5	1·31	4	+ 0·32	+ 24
North-East ..	55	4	·75	3	— 0·20	— 27
Kaffraria	49	4	98	4	,, 0·49	,, 50
Basutoland .	·36	2	1·15	3	,, 0·79	,, 69
Orange River Colony ..	1·05	4	69	2	+ 0·36	+ 52
Durban (Natal) ..	1·29	7	1·93	..	— 0·64	— 33
Bechuanaland ..	00	0	29	1	,, 0·29	,, 100
Rhodesia	00	0	36	2	,, 0·36	,, 100

On tabulating the totals for the month, it is found that of the 329 stations 156 had totals of 1 inch or less, exclusive of 28 stations reporting "Nil," of the remaining 145 stations, 76 had from 1 to 2 ins, 22 from 2 to 3 ins, 29 from 3 to 4 ins.; 12 from 4 to 5 ins., while six (6) had more than 5 inches These were Kenilworth (Cape Peninsula) 5·66 ins., Danger Point, 5·96 ins., Bishopscourt, 6·22 ins; Ceres, 6·30 ins.; Waai Kopje (Table Mountain), 7·65 ins, and St. Michael's with the maximum of 8·18 ins, also situated on Table Mountain. Taken as a whole, the intensity of the precipitation was about the average, the maximum precipitation in 24 hours during the month failing to exceed one inch (1 in.) at 284 out of 326 stations for which the necessary particulars were available. Of the rest, 39 had a maximum daily fall of between 1 and 2 inches. The only three (3) which exceeded 3 inches in any one day were Alexandria, 2·40 ins. on the 16th; Vijgebooms Rivier with 2·04 ins. on the 4th; and Ceres with 3·45 ins. also on the 4th. The *Thunderstorms* reported were mostly local, except on the 21st, when 29 cases (out of the total of 45 on 11 days of the month) occurred. *Hail* fell at 20 stations on 10 days mostly on the 5th and 6th. *Snow* fell at 36 stations on 10 days during August, viz., 5th to 7th; 15th to 17th; 22nd to 25th, and at Zwartberg Pass on the 30th. The distribution of snow was widest on the 23rd being reported from 15 stations on that date. *Sleet* fell at 16 stations on 7 days, mostly on the 23rd.

Temperature, Cloud and Wind.—During the month of August, there was a decided drop in the temperature curve, as compared with July, the mean temperature being only 52·1°, which is 4·1° lower than the average, and 2·7° less than in July. The difference was unequally divided between the day and the night temperatures, the mean maximum, 63·8°, being 5·3° lower than the average while the mean minimum, 40·4° was 2·9° less than usual. Consequently the mean daily range of 23·4° was less than the normal by 2·4°. These low temperatures seem to have been general over the whole country, the deficits in the day temperatures being almost twice as much on the coast as inland, and *vice versa* as regards the minimum temperatures. The mean warmest station was Hopefountain, near Bulawayo, with 63·1°, and the mean coldest, Hanover, with 39·2°, shewing a difference of 23·9°. The highest mean maximum temperature of 77·3 was that of Hopefountain, and the lowest mean minimum of 22·7° occurred at Hanover. The dates of occurrence of the absolute maximum temperature at the various stations did not shew much variation being almost wholly from 11th to 14th along the Coasts and for some distance inland, and from 26th to 30th further inland. Greater diversity is exhibited in the date of occurrence of the absolute minima, which were mostly registered on the morning of the 8th, 16th, and 24th to 28th. The mean of the absolute maxima amounted to 79·3° and of the absolute minima to 31·5 showing a mean monthly range of 47·5° or almost 6° more than in July. The warmest days in August were, on an average, 2·5° warmer than in July, but the coldest mornings were 3·2° colder than during the same month. The highest reading of the thermometer recorded during August was 91·0° on the 15th at Port St. John's and the lowest, 17·0° on the 23rd at Moyeni in Basutoland, an extreme range of 77·0° during the month. Temperatures exceeding 90·0° were registered at only three stations, whilst minimum temperatures below the Freezing Point were the rule and not the exception. In spite of this, however, the fruit blossoms seem to have been but little affected, and if the young fruit escapes the killing frosts which occasionally occur in September and October, there seems every reason to expect a good season. *Frosts* were recorded at 86 stations on 29 days of the month, the exceptional dates being the 19th and 20th; they were most numerously reported from 7th to 10th and from 26th to 28th.

The low day temperatures were asssociated with an excess of *Cloud*, the mean percentage for the month being 39.5 or 5·8 per cent. greater than the normal and 4·5 per cent. more than during June. It increased fairly regularly from the coast inland, being most 40 to 60 per cent. along the coasts, 30 to 40 per cent. along a narrow strip parrallel with the coast, and 25 to 30 per cent. in the interior. It varied in amount from 60 per cent. at Cape St. Francis to 15 per cent. at O'okiep.

Fog or *Mist* was reported from only 56 stations on 24 days, most widely on the 16th.

The prevalent morning winds were mostly Southerly in the South-West, Westerly to North-Westerly in the interior, and South-Easterly at Hopefountain, with frequent calms. The mean force on the Beaufort Scale was 2·15, corresponding to a mean velocity of 13·75 miles per hour. The winds although fairly strong throughout the month, attained the force of a gale on only 4 days, chiefly the 26th.

OBSERVERS' NOTES.

VRUCHTBAAR.—We had frosts several nights during August, which have done damage to early apricots in bloom at that time. Cereal crops look very promising, though they are later than usual.

BUFFEL'S NEK.—There was a heavy fall of snow on the 23rd.

SUNNYSIDE (Witteklip).—It is one of the coldest winters we have had for several years.

Boschfontein —Mostly very cold days with light westerly winds, varied by an odd hot day with overcast sky Several intensely cold days towards end of month. Severe frosts -stagnant waters remaining frozen over for several hours after sunrise Much sickness about in the way of colds and influenza All fruit blossoms very late and crops backward No locusts about after the first week of the month.

Waverley —A very cold and windy month. Severe frosts, which hindered the grass from growing. There was 18° of frost on the 7th.

Alexandria —Crops promising, no prevalent diseases

Fort Fordyce —Stock healthy and veld green since rains in middle of the month. Ploughing and sowing going on apace

Sunnyside (Albany) —Apricots, plums and peaches in full bloom Crops healthy.

Carnarvon Farm -Nothing special to chronicle this month The 0 67 in of rain is the best fall for August for the last five years, the 16 windy days is just about the average for same period The frosts were most severe—15 in number—of which eight were recorded up to the 12th, then a stoppage took and none again till the last seven days of the month Cloudless days only two, and for the year so far only 12 cloudless days Agricultural prospects, good throughout the country generally. No fruit killed anywhere so far, but from the 5th to the 10th October we generally have a frost and garden killer

Kokstad —Heavy cold westerly and south easterly winds prevalent during month Veld dry and parched Heavy frosts still prevalent Peach and apricot trees in full blossom Continuation of frosts points to poor fruit season, as fruit will shortly be forming

Zwartlaagte —Weather very changeable

Groot Drakenstein —A cold dry month Mean temperature 2 5° below average of last six years and 5·6° below mean of last month Mean minimum 3 3° below average last six years Rainfall 2 10 in below average of last ten years (5 53 in)

Kokstad (The Willows) —Some severe frosts Mornings usually calm, warmer than last month, but mean daily maximum slightly lower, owing to strong cold winds in forenoons, are the leading characteristics of this month Several times the expected rains threatened, but the clouds were blown away, and a dry spring is now feared There was a slight fall of snow on the night of the 23rd, which quickly melted and did not soak in to any extent. Veld parched stock in fair condition

TEMPERATURE, AUGUST, 1905.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory ..	60·6	46 1	53·4	76 4	11	38·2	16
Blaauwberg	61·0	46·8	53·9	72·0	11	40·0	16
Groot Constantia ..	59·9	44 4	52 2	77·0	11	39·0	4
Simon's Town	65 0	48 6	56·8	80·0	11	44·6	5
S.A. College ..	62·2	45·4	53 8	80 0	11	39·5	16
Sea Point . ..	61·0	47 2	54·1	77·6	12	40 1	28
Wynberg	62·5	44·7	53 6	82 8	11	38·2	6 & 8
Robertson Govt. Plantation	64 2	36·5	50 4	82 0	11	30 0	27
Elsenburg	60·5	40 7	50·6	79·1	12	32·8	24
Groot Drakenstein ..	62·6	41 8	52 2	80 3	11	33·4	16
Wellington	61·8	41·9	51 8	74 0	11	32 5	25
Ceres	61·1	32 8	47·0	68 0	11 & 28	29·0	16 & 28
O'okiep	63 4	40 4	51·9	78 0	12	33 2	16
Van Staaden's River	64 2	44 3	54 2	83·0	5 & 12	36·0	8 & 28
Concordia (Plantation) .	57·7	45·1	51·4	85·5	11	40 2	28
Cape St. Francis ..	61·6	48 0	54 8	69 0	11	41·0	8
Heidelberg	68 9	38·1	53·5	86 0	11	31·0	28
Cape L'Agulhas ..	58 9	49·1	54 0	78 0	11	41 0	28
Port Elizabeth ..	63 6	48 1	55·8	78·0	3	40·0	8
George (Plantation) ..	61·4	44 5	52 9	83·0	11	38 5	8
Amalienstein	65·8	36 1	51·0	83 0	11	29 0	8
Wagenaar's Kraal ..	61 1	33 0	47·0	74·0	12	20 0	25
Hanover	55 8	22·7	39·2	72 0	15	20 0	10 & 15
Murraysburg	63·1	32 6	47·9	76 0	29 & 30	20 0	25
Kimberley	70·7	37 2	54·0	84·1	29	29 2	23
Hope Town . ..	67 8	34 7	51·3	80·4	29	24·0	24
King William's Town ..	68 9	43·0	55·9	91·0	13	32 0	7
Sydney's Hope	62·7	43·7	53·2	84·2	13	34 0	27
Stutterheim	63 3	42 6	53·0	80 5	14	31 0	2
East London	68 0	48·9	58·4	91·0	14	43 0	3 & 26
Evelyn Valley ..	58 5	39·8	49·2	79 0	12	32·0	2 & 18
Aliwal North	64 4	34 6	49·5	78·5	29	25·0	9 & 25
Queenstown	64 8	38 4	51 6	80·0	29	22 0	8
Main	64·4	41·6	53 0	81 8	29	33·0	8
Matatiele	66 3	37 1	51·7	76·0	28	24·0	8
Port St. John's	67 2	50·2	58 7	94 0	15	44·0	8
Kokstad	65·5	35·5	50 5	73 0	29	26 0	8
Umtata	67 9	40·1	54·0	87·0	4	30·0	2
Mount Ayliff	65·8	42·4	54 1	81·0	29	31·5	7
Mafeteng	62 2	34 7	48 5	73 0	11	25·0	17
Teyateyaneng	65·8	32 8	49 3	73 0	29	24·0	24
Moyeni ..	63·6	31·1	47 3	75 0	15	17·0	23
Mohalie's Hoek ..	62·6	31 6	47 1	73·0	16	21 0	8
Leribe	64 4	33 9	49·6	79·5	26	20·7	23
Winburg ..	66·1	36 9	51·5	72·5	28	26·0	24
Hope Fountain ..	77·3	48 9	63·1	83·7	30	42·2	12
Means	63·8	40·4	52·1	79 3	..	31·8	..
Extremes	..	..	..	94·0	15th	17·0	23rd

RAINFALL, AUGUST, 1905.

I. CAPE PENINSULA:

	INCHES
Royal Observatory, (*a*) 12 inch gauge	3·06
Cape Town, Town House	3·18
Do South African College	3·59
Do Sea Point (Hall)	3·56
Do do (Attridge)	3·19
Do Molteno Reservoir	3·72
Do Platteklip	4.70
Table Mountain, Disa Head	3·49
Do Kasteel's Poort	4·16
Do Waai Kopje	7·65
Do St. Michael's	8·18
Bishopscourt	6·22
Kenilworth	5·66
Wynberg (St Mary's)	4·82
Groot Constantia	4·77
Tokai	3·58
Simon's Town (Wood)	4·23
Do. (Gaol)	3·98
Blaauwberg Strand	2·02
Robben Island	1·75
Camp's Bay	2·33
Fish Hoek	2·87
Cape Point	1·03
Woodstock	3·98
Do (The Quarry)	4·54
Plumstead	3·62

II. SOUTH-WEST:

	INCHES
Eerste River	3·69
Stellenbosch (Gaol)	3·80
Somerset West	3·55
Paarl	4·69
Wellington (Gaol)	3·98
Groot Drakenstein	3·43
Tulbagh	1·74
Ceres	6·30
Worcester Gaol)	1·44
Hex River	2·13
Lady Grey (Div. Robertson	1·09
Robertson	1·57
Robertson (Govt Plantation)	1·48
Montagu	1·24
Porterville Road	3·27
Rawsonville	3·83
Danger Point	5·86
Vijgeboom's River	4·84
Elsenburg Agricultural College	2·29
Roskeen	3·31
Vruchtbaar	3·73

III. WEST COAST:

	INCHES
Klipfontein	0·58
Kraaifontein	0·74
O'okiep	0·60
Concordia (Krapohl)	0·51
Garies	0·21

III. WEST COAST—*Continued*

	INCHES
Kersefontein	1·86
The Towers	2·52
Dassen Island	1·41
Malmesbury	3·28
Piquetberg	2·15
Van Rhynsdorp	0·78
Clanwilliam (Gaol)	0·54
Welbedacht	1·59
Lilyfontein	0·35
Zoutpan	1·54
Wupperthal	0·81

IV. SOUTH COAST:

	INCHES
Cape L'Agulhas	1·25
Bredasdorp	2·28
Swellendam	2·40
Heidelberg	0·73
Riversdale	0·47
Geelbek's Vlei	0·45
Mossel Bay	0·92
George	1·61
Millwood	2·79
Sour Flats	2·09
Concordia	3·17
Knysna	2·80
Buffels Nek	4·18
Plettenberg Bay	3·70
Blaauwkrantz	3·12
Cape St. Francis	4·13
Witteklip	3·19
Van Staaden's (upper)	3·22
Uitenhage	1·13
Do (Park)	1·15
Port Elizabeth (Harbour)	3·69
Tankatara	1·84
Shark's River Nursery)	4·12
Zuurbraak	2·50
Vogelvlei	0·51
Great Brak River	0·93
Kruis River	1·26
Centlivres	0·72
Woodfield	2·00
George (Plantation)	1·30
Potberg	1·45

V. SOUTHERN KARROO:

	INCHES
Ladismith	1·51
Amalienstein	0·68
Calitzdorp	0·30
Oudtshoorn	0·38
Uniondale	1·13
Kleinpoort	0·45
Glenconnor	0·75

VI WEST CENTRAL KARROO

Prince Albert Road	0·09
Prince Albert	0 31
Zwartberg Pass	1·82
Nel's Poort	0 25
Camfer's Kraal	0 08
Baaken's Rug	0 29
Willowmore	0 20
Steytlerville	0 26
Krom River	0 04

VII EAST CENTRAL KARROO

Aberdeen (Gaol)	0 76
Do (Bedford)	0 92
Rietfontein	0 16
Winterhoek	0·89
Klipdrift, De Erf	0 53
Kendrew	0 88
Graaff Reinet	0 73
Do (College)	0 85
New Bethesda	0 53
Roode Bloem	0 57
Jansenville	0 68
Patrysfontein	0 26
Klipfontein	0 58
Cranemere	0 57
Pearston	0 95
Somerset East	1 51
Middleton	0 99
Corndale, Div of Aberdeen	0 64
Middlewater	1 11
Darlington	0 52
Glen Harry	0 25
Bloemhof	0 49
Walsingham	0 72
Arundale	0 78
Spitzkop (G R)	0 83

VIII NORTHERN KARROO

Calvinia	1 14
Sutherland	0 85
Fraserburg	0 15
Carnarvon	0 11
Wagenaar's Kraal	0 02
Brakfontein	0 03
Victoria West	0 08
Britstown	0 00
Murraysburg	0 03
De Kruis	0 10
Richmond	0 56
De Aar	0 00
Middlemount	0·00
Hanover	0 05
Philip's Town	0·06
Boschfontein	0 14
Petrusville	0 00
The Willows	0 23
Middleburg	0 76
Colesberg	0 20
Tafelberg Hall	0 18
Cradock	0·74
Witmoss	1 08
Steynsburg	0 56
Tarkastad	0 75
Riet Vlei	0 92

VIII N KARROO—*Continued*

	INCHES
Varken's Kop	0·55
Culmstock	0·61
Doorskuilen	0 00
Hillmoor	0 13
Arundel	0 36
Loxton	0 00
Waverley	0 87
Wildebeestkooij	0·00
Maraisburg	0 25
Glen Roy	1 09
Montagu	0 10
Schuilhoek	0 35
Vosburg	0 00
Zwavelfontein	0 00

IX NORTHERN BORDER

Kenhardt	0 00
Van Wyk's Vlei	0 00
Prieska	0 00
Dunmurry	0 00
Griqua Town	0 00
Douglas	0 00
Avoca (Herbert)	0 00
Hopetown	0 08
Newlands (Div Barkly West)	0 00
Kimberley (Gaol)	0 00
Do (Stephens)	0 02
Bellsbank (Div Barkly West)	0 07
Barkly West	0 03
Upington	0 00
New Year's Kraal	0 00
Karree Kloof	0 00

X SOUTH EAST

Melrose	1 32
Fairholt	1 48
Cheviot Fells (Bedford)	1 16
Bedford (Gaol)	2 50
Sydney's Hope	1 90
Adelaide	1 40
Atherstone	1 88
Alexandria	3 79
Salem	1 64
Graham's Town (Gaol)	1 48
Heatherton Towers (near Graham's Town	0 93
Fort Beaufort	1 43
Katberg	2 12
Balfour	1 52
Seymour	1·87
Glencairn	1 74
Alice	1 16
Port Alfred	3 49
Hogsback	2·34
Thaba N'doda	2 67
Peddie	1 75
Cathcart	1 50
Keiskama Hoek	1 78
Crawley	0·86
Thomas River	1 08
King William's Town	1 05
Do Hospital	1·41
Dohne	1 05
Kuousie	1·97

X. SOUTH EAST—*Continued*

	INCHES
Blaney	1 00
Kei Road	0 90
Evelyn Valley	4 29
Berlin	1 07
Isidenge	1·52
Perie Forest	1 35
Quacu Forest	1·22
Kologha	1 17
Fort Jackson	1 30
Komgha	0 92
Prospect Farm (Div. Komgha)	1 04
East London, West	1 21
Do East	1 58
Fort Cunynghame	1 18
Fort Fordyce	2 40
Daggaboer	1,76
Lynedoch	1·62
Sunnyside	1 40
Forestbourne	1 33
Chiselhurst	1 35
Wolf Ridge	2 47
Dontsah	1·64
Mount Coke	1 10
Blackwoods	2 02
Albertvale	1 52

XI NORTH EAST

Venterstad	0 14
Ellesmere	0 17
Molteno Station	0 45
Thibet Park	0 93
Sterkstroom	0·5
Carnarvon Farm	0·6.
Jamestown	0 52
Queenstown (Gaol)	0 75
Do (Beswick)	0 95
Herschel	0 21
Lady Grey	0 46
Bolotowa, Contest	0 87
Lady Frere	0 65
Keilands	1 05
Barkly East	0 58
Lyndene	0 39
Mooifontein	0·21
Poplar Grove	1·02
Whittlesea	0 67
Halseton	0·44
Nooitgedacht	0·48
Blikana	0 34
Albert Junction	0 34
Hughenden	0·19
Glen Wallace	0·80
Bensonvale Inst.	0 31

XII. KAFFRARIA.

	INCHES
Slaate, Xalanga	0 64
Ida, Xalanga	0 73
Cofimvaba	0 98
Nqamakwe	0 83
Main	0 61
Engcobo	0·60
Butterworth	0 39
Kentani	0·54
Maclear	0 24
Idutywa	0·30
Willowvale	0 35
Mount Fletcher	0·19
Elliotdale	1·02
Mqanduli	0·70
Matatiele	0·12
Umtata	0·71
Kokstad	0·09
Port St. John's	1 03
Umzimkulu	0·23
Tabankulu	0·28
Somerville (Div Tsolo)	0·37
Tsomo	1 05
Cwebe	1 09
Mount Ayliff	0 34
Seteba	0 04
Flagstaff	0 61
Insikeni	0 36
Mandileni	0 03
Cedarville	0 07
Kokstad The Willows)	0 13

XIII. BASUTOLAND

Mafeteng	0·57
Mohalie's Hoek	0·09
Qacha's Nek	0·21
Moyeni Quthing	0 35
Teyateyaneng	0 61
Maseru	0 21

XIV ORANGE RIVER COLONY

Kroonstad	2 77
Imperani	0 34
Winburg	0 05

XV. NATAL

Durban, Observatory	1 29

XVII. BECHUANALAND.

Vryburg	0 00
Taungs	0 00
Setlagoli	0·00
Zwartlaagte	0·00

XVIII. RHODESIA.

Hope Fountain	0 00
Matopo Park	0·00
Fort Rixon	0·00

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 16th September, 1905, ruling at the several centres named, is published for general information :—

CENTRE.	A Wheat per 100 lb.	B. Wheat Flour per 100 lb	C. Boer Meal per 100 lb.	D. Mealies per 100 lb	E. Mealie Meal per 100 lb	F Barley per 100 lb.	G Oats per 100 lb	H Oat-hay per 100 lb	J. Potatoes per 100 lbs.	K Tobacco (Boer Roll) per lb	L Beef per lb	M. Mutton per lb	N. Fresh Butter per lb.	O. Eggs per doz	P. Cattle (Slaughter)	Q. Sheep (Slaughter)
	£ s d	£ s d	£ s d	£ s d	£ s d	s d	s d	£ s d	£ s d	£ s d	s d	s d	£ s. d	s. d.		
Aliwal North ..	0 12 0	0 15 0	0 13 0	0 6 0	0 8 6	10 0	9 0	0 7 6	0 8 6	1/6 to 4/-	*4d to 8d	...	0 2 6	1 6	£13	21/- to 21 -
Beaufort West	0 12 3	0 17 6	0 12 6	0 8 0	0 11 0	10	0	0 6 0	0 12 0	0 0 9	*6d to 1s †5d to 10d	*7dto 8d †5d to ·d	0 2 0	1 3	£16	25/-
Burghersdorp .	.	...	...	...	. .	.	...	.	0 7 6	...	*0 11½	*0 8	0 1 6	1 0	...	..
Cape Town ...	0 9 3	0 13 3	0 10 3	0 7 0	0 8 0	7 9	7 6	0 4 3	9/- to 10/-	0 0 8	0 9	0 7½	1/3 to 1'4	1 3	£16 to £20	25/-
Clanwilliam .	0 13 0	1 10 0	0 14 0	0 12 6			10 0	..	...	0 4 6	0 8	0 8	0 1 6	1 0	...	22/6
Colesberg ..	...	...	...	0 5 9	...	..	. .	0 6 0	17/- bag	...	...	*0 7	0 1 3	1 3	...	...
Cradock .	.	..	...	0 5 6	..	...	...	0 6 9	0 11 0	0 0 6	0 5	0 6	0 1 7	1 2	...	...
Dordrecht	0 11 0	0 15 6	0 12 6	0 7 0	0 8 6	9 6	8 0	0 7 6	0 12 6	0 1 0	0 9	0 8	0 1 3	1 0	£11	22/6
East London ..	0 13 0	0 15 0	0 13 0	0 6 6	0 10 0	8 0	9 0	0 7 0	0 13 0	0 1 6	*†0 7	†6d & *8d	0 2 3	1 2	£22	37/-
Graaff-Reinet ..	0 10 6		0 12 0	0 6 0		8 0	9 0	0 7 6	0 13 6	0 0 6	0 7	0 7	0 1 9	1 0	£10 to £12 10s	20/- to 25/-
Graham's Town	.	..	...	0 7 0	...	7 6	...	0 5 6	0 13 6	..	*0 8½	*0 8½	...	1 3½	...	...
Kimberley ...	0 10 6	0 14 0	0 13 0	0 6 0	0 6 0	8 6	8 0	0 5 6	0 16 0	0 0 8	*0 10	*0 8	0 1 6	1 6	£12 to £14	17/- to 20/-
King Wm's Town	0 9 0	0 15 0	0 12 0	0 7 6	0 7 6	8 0	9 0	0 7 0	0 10 0	0 0 6	*0 6½	*0 6½	0 2 0	1 0	£15 3s. 9d	26/6
Malmesbury ...	0 11 6	0 13 6	0 10 6	0 10 0	...	10 0	8 0	0 3 6	0 8 4	0 1 0	*†0 8	*†0 9	0 1 3	1 3	£16	23/6
Mossel Bay ...	0 10 0	0 15 0	0 18 0	0 16 6	..	4 0	10 0	0 8 6	1 0 0	0 1 0	*9d & †8d	*9d & †8d	0 1 6	1 6	...	...
Port Alfred ...	0 12 0	0 19 0	0 15 0	0 7 6	0 12 0	8 0	10 0	0 6 0	0 9 0	0 0 9	0 8	0 6	0 1 6	0 6	...	...
Port Elizabeth ...	...	...	...	0 7 0	..	7 6	...	0 5 6	0 15 0	0 0 5	*0 7	*0 7	0 2 0	1 3	...	...
Queen's Town ...	0 6 9	0 14 0	0 7 0	0 6 0	0 6 0	6 3	6 0	0 6 [illegible]	0 10 0	0 1 6	*0 6	*0 7	0 1 6	1 3	£12 to £15	15/- to 20/-
Tarkastad	0 13 6	0 15 0	0 13 6	0 10 0	0 13 0	10 6	...	0 8 6	0 10 0	0 1 0	*8d & †6d	*7d & †6d	0 1 9	1 6	£15	22/-
Vryburg .	0 11 0	0 18 0	0 14 0	0 5 9	0 8 6	12 0	10 0	0 7 6	0 10 6	0 0 6	*0 10	*0 9	0 1 9	0 10	£13 10s.	20/-
Worcester ...	0 9 6	0 14 0	0 11 6	0 7 6	0 7 0	8 0	7 6	0 4 6	0 10 0	0 0 6	*9d & †8d	*8d & †7d	0 1 6	0 9	...	...

NOTE.—A blank space denotes "no transactions" * Colonial. † Imported.

DEPARTMENTAL NOTICES.

Regulations for the Introduction of Sheep into the Colony by Land

The following regulations are published under Proclamation No 285, of 1905 —

1. In these Regulations the term "sheep" includes "goats"

2 No sheep shall be introduced into the Colony from any neighbouring State, Territory or Colony

(a) Unless they shall, save and except sheep introduced from the Transvaal have been at least twice dipped in a dip approved by the Government, as per list of dips in Government Notice No 545 of 1905, or any addition thereto, or in a dip made of tobacco or sulphur, and with respect to sheep introduced from the Transvaal, unless they shall have been dipped in any dip aforesaid and at least a second time in an approved arsenical dip The dipping shall in each case have taken place within 14 days of the date of introduction, and at an interval of not less than 16 days between each dipping

(b) Unless the person in charge of such sheep shall have obtained and have in his possession a certificate with regard to such sheep, in the form set forth in Schedule A hereto, signed by an Inspector of Stock appointed to administer Scab Laws or Regulations in such neighbouring State, Territory or Colony and

(c) Unless in respect of sheep introduced by road, such certificate shall have been before their introduction endorsed by the Sheep Inspector of the District or area into or through which such sheep shall enter in manner provided in Regulation 3

3 No person intending to introduce sheep by road shall be permitted to introduce such sheep unless he shall have obtained the aforesaid endorsement, and he shall with that view give timely notice to the Resident Magistrate of the District in this Colony into or through which the sheep are to enter the Colony, stating the number of sheep, some place distant not more than three miles outside the border of the Colony, where the sheep may be inspected, and the proposed time of introduction, and upon receipt of such notice the Resident Magistrate shall forthwith communicate the same to the Sheep Inspector of the District or area into which the sheep are intended to pass, and such Inspector shall proceed at the time and to the place specified in such notice, or so soon thereafter as may be possible, then and there to examine such sheep

4 The person in charge of such sheep shall be bound to produce the certificate aforesaid to the Inspector, and such Inspector shall, if he is satisfied that the sheep have been properly dipped according to Regulation 2 and if they are free from scab, make an endorsement on the certificate in the form given in Schedule B, and the sheep may thereafter proceed on their way

5. If the certificate be incomplete in any particular, or if upon examination of such sheep the Inspector is not satisfied that the sheep have been properly dipped according to Regulation 2, or if he discovers the existence of scab among them, he shall refuse to allow them to enter his area until they shall have been again dipped once or twice as he shall see fit, and a second certificate in the form prescribed in Schedule A shall have been by him given in respect of them

6 If the sheep be forwarded from the neighbouring State, Territory or Colony by railway, the notice prescribed in Regulation 3 shall be sent to the Resident Magistrate of the district to which the sheep are destined to be conveyed, and such Resident Magistrate shall communicate the same to the Sheep Inspector of the district or area in which is situated the Railway Station to which such sheep are consigned or where there shall be no such Inspector, to some deputy duly appointed for the purpose The certificate provided in Regulation 2 shall be sent by the owner or sender to the Station-

master or other official at a station or siding in such State, Territory or Colony, for delivery to the guard of the train by which such sheep are conveyed, and shall be by the guard in turn delivered to the Inspector or such other official on arrival at the destined station or siding, or to the Stationmaster or official in charge of such station or siding

7 Upon arrival at the destined station or siding the Sheep Inspector or duly appointed deputy, as aforesaid shall, if he is satisfied that the sheep have been properly dipped according to Regulation 2, and if they are free from scab, make an endorsement on the certificate in the form given in Schedule B, and the sheep thereafter may proceed on their way, provided that until the certificate shall have been so endorsed, the sheep shall not be delivered by the railway officials to any person without the leave of the Commissioner of Public Works, after consulting with the Secretary for Agriculture, but the Inspector or duly appointed deputy shall have authority to direct that such sheep shall be dealt with in accordance with the Scab Act and these Regulations

8 If the certificate be incomplete in any particular, or if upon examination of such sheep the inspector or duly appointed deputy is not satisfied that the sheep have been properly dipped according to Regulation 2, or if he discovers the existence of scab among such sheep, he shall before making the endorsement, in the preceding Section provided for, dip them once or twice as he shall see fit, at the cost of the owner of such sheep, and such cost shall be recovered by means of the sale at public auction of so many of such sheep as may be required to defray such cost

9 If such sheep be forwarded by railway from the Orange River Colony, or from any State, Territory or Colony, in which any law for the prevention of scab among such sheep shall be in force, and to which this Regulation shall be applied by Government Notice, consigned direct to a butcher for slaughter purposes, it will suffice if they are accompanied by a certificate issued by an Inspector of Stock appointed to administer Scab Laws or Regulations in such State, Territory or Colony, for the prevention of scab among sheep, to the effect either that the said sheep are free from scab or that they have been properly dipp d under the supervision of such Inspector and have been marked with a special paint or tar mark, which certificate shall as nearly as may be possible follow the form prescribed in Schedule C of these Regulations

10 The person in charge of such sheep so consigned, or the person consigning the same shall be bound to produce or deliver or cause to be delivered the certificate aforesaid to the Sheep Inspector of the district or area to which such sheep are destined, or where there shall be no such Inspector to the deputy duly appointed for the purpose, and such Inspector or deputy shall, if the certificate be in order, and the sheep are free from scab, make an endorsement to that effect on the certificate and the proviso to Regulation 7 shall apply to all sheep so introduced

11 If the certificate be incomplete in any particular, or if upon examination of such sheep the Inspector or deputy as aforesaid discovers the existence of scab among them, he shall cause them to be dipped once under his supervision before delivery or removal

12 Any person contravening these regulations shall upon conviction, be liable to a fine not exceeding twenty pounds sterling

Form
Q

SCHEDULE A

(*Regulations published in Proclamation No* 28,*, 1905)

IMPORTATION OF SMALL STOCK OVER LAND.

CERTIFICATE

Of dipping of Sheep and (or) Goats specified herein ,—

Name of owner

Address

In charge of

Farm and locality from which to be removed

Place in Colony to which to be removed

Sheep.	Number.	Marks	Goats.	Number	Marks
Merinos	—	—	Angoras		
Cross breed Sheep ..	—	—	Cape Goats		
Cape Sheep ..		—			

Date of first dipping in dip
Date of second dipping in dip

Inspector of Stock appointed to administer Scab Laws or Regulations.
Dated District
on 190

Note —The interval between each dipping must not be less than 16 days, and the second dipping must be within 14 days of the date of introduction

The dip must be either tobacco, sulphur, or one of the patent dips approved by Government Notice No 515 of 1905, or subsequent notices, and, in the case of sheep introduced from the Transvaal, the second dipping at least must be performed in an approved arsenical dip

SCHEDULE B

ENDORSEMENT TO BE MADE BY THE INSPECTOR

I hereby certify that I have examined the sheep to which this certificate refers, and find them to have been dipped in accordance with Regulation 2 of Proclamation No. 285* of 1905, and to be free from Scab

(Sgd)
Sheep Inspector
District.
Dated at on 190

Form
R

SCHEDULE C.

IIMPORTATION OF SLAUGHTER STOCK.

I hereby certify that I have this day examined the sheep and goats owned by
and running on the farm in the
sheep,
goats
are free from scab, or have been properly dipped under my supervision and marked with a special mark in paint
tar.

Inspector of Stock, appointed to administer Scab Laws or Regulations.
District.
Dated at on 190. .

Regulations for the Introduction and Quarantine of Cattle and Sheep introduced into this Colony from the Argentine Republic, Uruguay, &c

The following regulations are published under Proclamation No 299 of 1905 —

1 For the purpose of these regulations the term ' Stock ' shall be held to mean horned cattle sheep and goats

2 The importation will be allowed only through the Port of *Cape Town*

3 The stock on arrival at the Port shall be inspected by a Government Veterinary Surgeon and, if passed, shall be permitted to be landed, under the supervision of a Harbour Board Officer and at the risk and expense of the importer, into sheds at the South Arm, Alfred Docks, where it will be quarantined for a period of four days

Should no indication of disease be discovered amongst such stock during the period of quarantine they shall be exempt from further detention, and may be removed to any place within the Colony Such stock, however, shall, in terms of the Municipal Regulations, not be driven through the streets of Cape Town, save and except between the hours of 11 p m and 6 a m , but during other hours may be removed by rail

4 All stock so landed must be accompanied by a Certificate in the subjoined form " A," and all Cattle so landed must in addition be accompanied by a Certificate in the subjoined form " B," and, unless intended for immediate slaughter, by a further Certificate in the form " C

5 All cattle not intended for immediate slaughter, and unaccompanied by such certificate " C may nevertheless, be landed, but must be submitted to the *Tuberculin* test at the Quarantine Station, and any which re act thereto shall be slaughtered forthwith

6 Should any appearance of infectious or contagious disease be discovered by the Veterinary Inspector amongst the live stock on board any vessel on her arrival in the Bay, such live stock will not be allowed to be landed alive but must be slaughtered on board either the same vessel or any other vessel to which it may be permitted to be transferred The carcases, however, after being properly dressed on board, and after the removal of any affected organs, such as the heads and feet, may be allowed to be landed The offal and all diseased parts or organs must be taken out to sea, properly weighted under the direction of a Harbour Board Officer, and thrown overboard at a spot indicated by the Port Authorities

The hides and skins of all stock slaughtered in the Bay will not be allowed to be landed, until they are disinfected to the satisfaction of the Government Veterinary Surgeon

7 No litter, manure, or hay of any kind, shall be thrown over board in the Bay, or be allowed to be landed from any vessel carrying live stock amongst which any infectious disease has appeared these articles must be either consumed by fire on board or taken out to sea and disposed of in the same manner as the offal, &c

Hay properly baled and stored in closed hatches which have not been opened during the voyage may, however, be allowed to be landed, if the Veterinary Officer is satisfied that there has been no communication between such close hatches and the other parts of the vessel during the voyage

8 Should any appearance of an infectious or contagious disease manifest itself at any time amongst such imported live stock while in quarantine, the whole consignment must be slaughtered by the importer forthwith in the sheds provided for the purpose, and the diseased organs, offal, blood manure litter, hay, &c , disposed of in the manner set forth in paragraphs 6 and 7

9 After each day s slaughtering, the importer must clean up the the slaughter-house and place all hides offal, fat, etc , in the proper receptacles for their removal, to the satisfaction of the Government Officer

10 All carcases must be removed by the importer from the cooling-room together with all hides, offal, fat, etc within 15 hours of the termination of each day's slaughtering

11. All slaughter stock intended for removal from the Quarantine Station shall be branded with a Government mark S to signify that it is intended for slaughter only.

12. All provender shall be supplied by the importer, and all stock in pens in quarantine, or awaiting slaughter, are to be fed and watered by the importer, who must also arrange for the cleansing of the pens and the removal of all offal, etc., into trucks, at the close of each day, to the satisfaction of the Officer appointed by Government

13. All loading of stock from the pens to the train must be performed by the importer, when removed by rail.

14. The importer will be required to pay the Dock dues, etc., imposed by the Table Bay Harbour Board, and, in addition, a special charge of 1s. 6d. per head for Horned Cattle and 3d. per head for Sheep and Goats landed into the sheds at the quarantine station.

15. Any importer or agent contravening any of these Regulations, or neglecting or refusing to make the payments as required in the last preceding Section, shall be liable to the penalty provided in Section 14 of Act No. 27 of 1893, that is to say, a fine not exceeding fifty pounds sterling or, in default of payment, to imprisonment with or without hard labour for any period not exceeding three months, unless such fine be sooner paid

CERTIFICATE "A."

I do hereby certify that the undermentioned Stock is free from disease, and has come from an area which is free from Epizootic Aphtha (Foot and Mouth Disease).

Number and general description of Stock

Place from which Stock has come

Name of Consignee

Signature
Title
Place

Date

To be signed by an Officer specially authorised to perform the duty by the Government or State Administration of the Country from which the Stock is shipped.

CERTIFICATE "B."

I do hereby certify that the undermentioned cattle are free from disease, and have not come from a locality in which the disease known as Redwater, Texas Fever, Tick Fever or Tristeeza is indigenous, and in which healthy cattle from non-infected areas are liable to become infected with the said disease.

Number and general description of the cattle

Place from which cattle have come

Name of Consignee

Signature
Title
Place

Date

To be signed by an Officer specially authorised to perform the duty by the Government or State Administration of the Country from which the cattle are shipped.

CERTIFICATE "C."

I hereby certify that the undermentioned cattle, branded with the sign T, have been submitted by me to the Tuberculin Test, and, not having re-acted thereto, I consider them free from Tuberculosis

Number and general description of Cattle

Place from which Cattle have come

Name of Consignee

Signature

Title

Place

Date

To be signed by an Officer specially authorised to perform the duty by the Government or State Administration of the Country from which the cattle are shipped.

The Angora Export Duty Act.

The following regulations under the Angora Export Duty Act are published under Proclamation No. 298 of 1905:—

1. No Angora ram or ewe shall be exported from this Colony to or through the territory of German South-West Africa, save and except through the place known as Rietfontein, in the Division of Gordonia.

2 Upon and in respect of every Angora ram or ewe so exported from this Colony there shall be paid a duty of one hundred pounds (£100) sterling to the Customs Officer appointed at Rietfontein to receive the same.

3. Every person who shall contravene any of the foregoing regulations shall, on conviction, be liable to a fine of not less than twenty-five pounds, nor exceeding one hundred pounds for every such ram or ewe so exported, or, in default of payment, to imprisonment, with or without hard labour for any term not being less than one month, nor more than six months, unless such fine be sooner paid.

Regulations for the Introduction from the Transvaal into Cape Colony of Hides, Skins, Horns, Wool and Mohair.

By Proclamation No. 300, the following regulations are published :—

1. The introduction from the Transvaal into this Colony of Hides, Skins, Horns, Wool and Mohair, shall be permitted only through the Ports of Entry established at Malmani Road, Myssymiyana and Fourteen Streams.

2. (a) *Dry* hides, skins and horns must be accompanied by a certificate to the effect that they have been properly cured and dressed.

(b) *Green* hides, skins and horns must be accompanied by a certificate to the effect that they have recently been properly disinfected in a 5% solution of Izal, Lysol, Jeyes' Fluid, Carbolic Acid, or any of the standard sheep dips of full strength.

These certificates to be under the hand of the Principal Veterinary Surgeon of the Transvaal or his authorised deputy.

3. Wool and Mohair must be properly baled and consigued, either by rail direct to a port for shipment oversea, or by road to any railway station between Mafeking and Fourteen Streams, both included, provided the bales shall not be opened at such station or anywhere *en route* to the port.

Application for the Services of Government Veterinary Surgeons.

It is hereby notified that as there are now several qualified Veterinary Surgeons in private practice in Cape Town and its vicinity, Kimberley, and Port Elizabeth, the services of Government Veterinary Surgeons in these places will be available only in cases where an animal is suffering from a contagious or infectious disorder, or in cases which are, on other grounds, of public interest and importance.

Farmers and owners of stock throughout the Colony frequently telegraph for one of the Government Veterinary Surgeons to be sent to attend to some valuable animal which has been taken seriously ill. It is rarely possible to comply with these requests at once; in the first place, because it is seldom that the Veterinary Officers can be communicated with immediately by telegraph, as they are generally engaged in the country at some distance from a telegraph station, and in the second place, because the only Veterinary Officer who may be at liberty to leave the work upon which he is engaged at the time may be at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any real service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the Veterinary Staff discredited. It would be much more satisfactory therefore in all cases in which veterinary advice and assistance are required, if the owner would telegraph to "Veterinus," Cape Town, with prepaid reply the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible This would enable the Chief Veterinary Surgeon to telegraph advice at once, and state whether he were able to arrange for veterinary attendance on the case or not, and thereby save valuable time, which is always of importance in acute and urgent cases.

It must, however, be clearly understood that, as this arrangement is intended purely for the benefit of farmers, the Government cannot accept any responsibility whatever, pecuniary or otherwise, for any loss of stock, etc., which may result from the treatment or advice of any Government Veterinary Surgeon.

Applicants for the services of the Government Veterinary Surgeons must, at their own cost, provide the necessary transport for the conveyance of these Officers from and back to their residences or nearest Railway or Post Cart Station.

D. Hutcheon,
Chief Veterinary Surgeon.

Veterinary Branch,
Department of Agriculture, 24th September, 1905.

List of Cape Government Veterinary Surgeons.

Stations.	Names.
Beaufort West	Mr. S. Elley, M.R.C.V.S.
Cape Town	Mr. J. H L Lyons, M R.C.V.S.
Cape Town	Mr C. Goundry, M.R.C V.S.
East London	Mr. R. W. Dixon, M.R.C.V.S.
Elsenberg (Mulder's Vlei)	Mr R. Paine, M.R.C.V.S.
Grahamstown	Mr T. Bowhill, F.R.C.V.S.
Grahamstown	Mr. J. Spreull, M.R.C.V.S.
Kokstad	Mr. M. A. Hutchence, M.R.C.V.S.
Mossel Bay	Mr. J. A. Robinson, M.R.C.V.S.
Molteno	Mr. W. G. Pakeman, M.R.C.V S.
Somerset East	Mr. J. D. Borthwick, M.R.C.V.S.
Uitenhage	Mr. G. W. Freer, M.R.C.V.S.
Umtata	Mr. P. X. Kearney, M R.C.V.S.
Vryburg	Mr. J. Neill, M.R C.V.S.
Worcester	Mr. A. Goodall, M.R.C.V.S.

Free Carriage of Cattle and Ostrich Dips.

It is hereby notified for general information that the undermentioned Cattle and Ostrich Dips will be carried free to purchasers thereof on the Cape Government Railways and by road, subject to the conditions specified in the subjoined Schedule

D. HUTCHEON,
Acting Director of Agriculture.

SCHEDULE OF CONDITIONS

1 The Dip must be carried from the nearest Railway Station or Port, as the case may be, or otherwise by the usual trade route serving the locality in which the purchaser resides

2 The Railage and road carriage, the cost of which will be borne by the Government, will be for the *forward* journey only, *i e*, from the nearest Railway Station or Port, or the usual trade route, as the case may be, to the purchaser's farm No cost of the *return* journey or any part of it will be borne by the Government

3 On delivery to the Civil Commissioner of the Division of the Railway consignment note or the receipt for transport, or both, and on presentation to him of the seller's invoice or receipt for any of the undermentioned Dips, a refund will be made to the consignee of the railway or transport charges, or both, paid by him

4 The Railway charges to be refunded will be at the third class rate

5 The transport charges shall not exceed those usually made to the general public

6 The following Cattle and Ostrich Dips have been accepted as effective Tick-destroying preparations for the purpose, and within the meaning of these Regulations and no other Dip will be recognised as an effective Tick destroying preparation until a sample is supplied for analysis and a test of its practical efficacy has been made in the presence and to the satisfaction of a Government Veterinary Surgeon, viz —

Alderson's Cattle Dip
Cooper's Cattle Tick Dip
Demuth's Cattle Dip
Fletcher's Albany Tick Dip
Hayward's " Fluid " Dip and Cattle Wash
Little's Cattle Tick Dip
Quibell's Paste Cattle Dip

Regulations for the Hire of Government Water Drills for Agricultural Purposes.

The following Regulations are hereby published for general information, and will operate until further notice

Copies of the Regulations will be obtainable from Civil Commissioners and Resident Magistrates, from the Public Works Department, Cape Town, and from the Assistant Inspector of Boring at Cradock

LEWIS MANSERGH,
Secretary for Public Works.

REGULATIONS.

GENERAL CONDITIONS.—1. Government Notice No. 717 of 7th July, 1904, and all previous Regulations are hereby cancelled.

2. These Regulations will not apply to Drills of large calibre suitable for deep boring, nor will they apply to any Water Boring which may be carried out for Municipal Bodies or for purposes not directly connected with the development of Farming and Agricultural Industry.

3. All persons already registered as applicants for Government Water Drills will receive attention under these Regulations in the date order of their original applications —taken together with the relative geographical position of their farms and the most expeditious route for the Drill.

4. All persons now registered as applicants for the services of Government Drills may elect either to remain under these Regulations: or, to secure the services of Boring Contractors under the separate Regulations for Contract Boring.

5. *From and after the date of this notice applicants will be dealt with only under one or other of the above alternatives—not under both.*

SPECIAL CONDITIONS.—6. All applications are received subject to such enquiry as may be deemed necessary; to any special conditions which may be notified to the applicant when the application is received, and which may then be accepted by him, and to such alteration in these Regulations as may be notified by the Government from time to time.

Applications must be made upon the subjoined form.

7. MACHINERY.—The Government only undertake to provide *a Drill* irrespective of class, such as may be available, and may be considered suitable for the locality affected.

The Government will provide the Drill and all necessary appliances for working it, together with the services of a Foreman (who will have entire charge of the machine and boring operations) and such skilled labour as may be necessary. Unskilled labour as specified in succeeding paragraphs of these Regulations must be supplied by the applicant.

8. LINING TUBES.—Where the hole or part of a bore-hole is not in solid rock the hole must be lined. The necessary tubes will be provided by the Government without extra cost to the applicant.

9. TRANSPORT. The Government will bear the cost of the carriage by rail of the drill appliances and employés in charge thereof to the Railway Station nearest to the farm of the first applicant to be attended to in any Division.

The applicant will provide transport for the drill and appliances, and for the foreman and engineman, and their baggage from the station to his farm.

Succeeding applicants will similarly provide transport from farm to farm, and the last applicant will provide it back to the nearest railway station, if required so to do.

Applicants will also provide transport as required from time to time between the farms and the nearest Railway Station, or such other point as may be selected, for the purpose of repairs to machinery, gear, etc.

10. POSTAL COMMUNICATION.—The applicant will provide means of communication with the nearest post and telegraph office at least once a week.

11. LABOUR (UNSKILLED).—The applicant will supply at his own cost and upon requisition from the Drill Foreman, rough or unskilled labour to the following extent.—

For Steam Drills: 3 men per diem for such days as may be notified from time to time.

For Hand Power Drills. 5 men per diem for such days, as may be notified from time to time.

12. FUEL AND WATER.—The applicant will supply at his own cost, all fuel (coal, wood or mest), together with water sufficient for working the drill.

13. PROVISION FOR FOREMEN, &c.—The applicant must in all cases undertake to supply food for the foremen and enginemen at reasonable prices. This, will, however, be a matter for private arrangement between the applicant and the employé named.

14. CHARGE TO APPLICANT.—The applicant will pay a charge of 5s per foot (five shillings) sunk for lined or unlined holes, irrespective of the diameter of the hole or the formation pierced. This charge will be the sole cost to the applicant, excepting transport, fuel, water, etc., under Sections 9, 10, 11 and 12 above.

15. APPLICANT'S LIABILITIES ON WITHDRAWAL OR DEFAULT.—In the event of withdrawal of any application, the applicant shall be liable for any actual cost incurred by the Government in preparing for the despatch of the Drill to his farm. The applicant may further be charged for any costs incurred through delays to the Drill

arising from applicant's default, or failure to comply with the conditions of these Regulations

16. Limits of Depth and Number of Holes to be Bored.—The maximum depth to be bored upon any one farm under these Regulations shall not exceed 300 feet unless a greater depth be specially authorised.

Only two holes will be bored on any one farm except in cases where trial holes may be abandoned on account of unfavourable geological indications, or other sufficient cause. Such trial holes may be bored to a reasonable extent provided the maximum of 300 feet be not exceeded.

17. Working Hours.—Working hours on ordinary week days will be from sunrise to sunset. On Saturdays work will cease at 1 p.m.

18. Cessation of Boring.—Boring will be stopped:—

(1) At the applicant's request, in which case he will be liable for all charges to date of stoppage at the rate specified.
(2) At the discretion of the Foreman, either
  (*a*) When a fair supply of water is struck.
  (*b*(When it is deemed by the Foreman unsafe to continue further boring
  (*c*) When the Drill strikes rock so compact that it cannot be penetrated without an excessive expenditure.

19 Selection of Sites.—If desired by applicant, the sites of boreholes will be selected by the Drill Foreman, or by other officers of the Department, if available.

Sites, however, may also be selected by the applicant subject to the reservation to the Government of the right to refuse to bore at any site which may be condemned as unsuitable, or upon which the expenditure of public funds is not considered to be warranted.

20. Results of Boring.—The Government, beyond providing sufficient plant and staff to work the Drill, does not guarantee any succesful result of the operations, and the undertaking will therefore be entirely at the applicant's risk. Every assistance within reason towards a successful issue of the operations will, however, be given.

Lewis Mansergh,
Secretary of Public Works.

APPLICATION FOR THE USE OF A GOVERNMENT WATER DRILL FOR AGRICULTURAL PURPOSES.

Address........

Date.

Sir,—I beg to apply for the use of a Water Drill on my Farm...... .... in Ward......... ....in Division of............ :...: ... . and I hereby agree to, and undertake to comply with, the terms and conditions set forth in the foregoing Rules and Regulations, governing the working of the Government Water Drills, with which I have fully acquainted myself.

I further undertake to pay on demand to the Civil Commissioner at... .... such sums as may become due, in terms of the said Rules and Regulations.

I certify that I have not had the services of a Government Drill since the 1st July, 1904, nor have I since that date received subsidy in respect to any work performed by a boring contractor.

I have the honour to be,
Sir,
Your obedient Servant,

The Secretary for Public Works,
Cape Town

THE PRODUCE MARKET

CAPE TOWN.

Mr. R Muller supplies the following report for the month ending 20th September, 1905.—

Wool —The market has been fairly well supplied and several lots of new Colonial wools were offered Most of the wools were taken for washing parcels and found ready purchasers, prices ranging from 5½d to 6½d according to quality and yield Roggeveld and Swellendam wools fetched up to 8½d Malmesburys of good quality and light from 6¾d to 7¾d, ordinary and burry lots up to 6d One lot of New Darling reached the very high price of 9½d Snow Whites are in good request Extra Supers ranging from 1s 8d to 1s 9½d, Supers from 1s 5d to 1s 7d Ordinary and Seconds from 1s 2d to 1s 5d according to quality At the Antwerp Sales on the 13th of last month, prices generally shewed an advance The London Sales opened on the 19th ult There was a keen demand, prices being a shade easier.

	s	d.	s.	d
Super Long Grass Veld Wool . ..	0	8	0	9¼
Super Long Karroo Veld Wool	0	6¾	0	7¾
Medium Karroo Veld Wool	0	5	0	6¼

	s.	d.	s	d.
Short and Inferior ..	0	4	0	5¼
Wool for Washing ..	0	4½	0	6½
Snow-white Super to Extra	1	7	1	10
,, Ordinary	1	2	1	7
Fleece Washed ..	0	9	0	10

Mohair —The news from Bradford is rather better, although no great volume of business has been put through, the undertone is healthy, and there is enquiry for good Firsts and Medium

	s.	d	s.	d
Mohair, Firsts, Summer	1	0	1	2
,, Kids . ..	1	3	1	5
,, Seconds ..	0	6½	0	9½

	s.	d.	s.	d.
Mohair Winter ..	0	10	0	11
,, ,, Kids..	1	0	1	1

Ostrich Feathers —There is not much change to report, the supplies are about of the usual average assortments Good pluckings are enquired for and find ready purchasers at unchanged rates

	£	s.	d	£	s.	d.
Super Primes	10	10	0	35	0	0
Firsts, Ordinary to Super ..	8	0	0	10	10	0
Seconds ..	6	0	0	8	0	0
Thirds ..	3	10	0	5	0	0
Femina (super)	7	0	0	10	0	0
Femina, Seconds to Firsts ..	4	0	0	6	10	0
Byocks (fancy) ..	5	0	0	7	10	0
Long Blacks ..	4	10	0	7	10	0
Medium Blacks	3	0	0	3	10	0
Short to Medium	0	10	0	2	10	0

	£	s	d	£	s	d.
Floss ..	0	5	0	1	10	0
Long Drabs ..	2	10	0	4	10	0
Medium Drabs..	1	5	0	1	15	0
Short to Medium	0	10	0	1	10	0
Floss ..	0	2	6	1	10	0
White Tails ..	1	5	0	1	15	0
Coloured Tails..	0	5	0	1	10	0
Chicks ..	0	1	0	0	2	0
Spadonas ..	2	10	0	4	0	0
Inferior Black & Drabs, Short to Long ..	0	0	6	1	10	0

Skins and Hides —The market is unchanged and there is a good enquiry for all classes

PORT ELIZABETH

Messrs John Daverin and Co, report under date, September 15th 1905 —

Ostrich Feathers —Our market was again well supplied this week with a fair average assortment Competition was general, and last week's prices were fully maintained There has also been a good business done out of hand at full prices Stocks have now been considerably reduced, and new arrivals are moderate and are likely to continue so during the near future The next London sales open on the 2nd proximo, when a rather limited quantity will be offered, and in consequence of this it is generally expected that the sale will go off well The total quantity sold on the public market this week amounted to £7,871 6s 7d, and weighed 3,985 lbs 15 ozs

	£	s.	d.	£	s.	d.
Primes : Extra super	Special Prices.					
Good to super	8	10	0	12	0	0
Whites: Firsts	6	10	0	8	10	0
Seconds ..	4	0	0	5	15	0
Thirds ..	2	10	0	4	0	0
Feminas : Tipped and Grey ..	4	10	0	7	0	0
Seconds ..	2	10	0	4	0	0
Thirds ..	1	10	0	2	10	0
Fancy ..	4	0	0	6	0	0
Tails White ..	1	5	0	2	10	0
Light ..	0	17	6	1	5	0
Coloured & Dark	0	5	0	0	12	6

	£	s.	d.	£	s.	d.
Blacks : Long ..	3	0	0	4	10	0
Medium ..	1	5	0	2	10	0
Short ..	0	10	0	0	15	0
Wirey .	0	1	0	0	1	6
Floss ..	0	6	0	1	5	0
Drabs : Long ..	1	10	0	2	10	0
Medium ..	0	12	6	1	5	0
Short ..	0	2	6	0	6	0
Wirey ..	0	0	6	0	1	0
Floss ..	0	6	0	1	5	0
Spadonas : Light	2	0	0	3	10	0
Dark ..	0	12	6	1	12	6
Chicks ..	0	0	3	0	1	6

Wool —This market remains very firm, and the few lots of new season's grease coming forward are readily sold at extreme prices Owing to the grand rains throughout the Colony and O R C , we expect that the condition of the new wools will be very good, which will enhance their value considerably.

Snowwhite Extra Superior ..	20d	20½d
Snowwhite Superior ..	17½d	19d
Do Good to Superior	16½d	17d
Do Inferior Faulty	15½d	16d
Grease Super Long, well-conditioned, Grassveld grown, special clips ..	7d	8d
Grease, Super Long well conditioned, Grassveld grown ..	6¼d	7d
Grease, Super Long, well-conditioned Karroo Grown ..	6¾d	7d
Grease, Super Long, well-conditioned, Mixed Veld ..	6¼d	6¾d
Grease, Light, faultless, medium, Grassveld grown.. ..	6d	6¾d
Grease, Light, faultless, medium Karroo grown	5½d	6d

Grease, Light, faultless, short Karroo grown	5½d	6d
Grease, Short, faulty and wasty ..	4½d	4¾d
Grease, Coarse and Coloured ..	5d	5½d
Scoured, Coarse and Coloured ..	6½d	10½d
Free State Grassveld Grease, long and well-conditioned ..	6½d	7d
Free State medium grown, light, with little fault ..	5½d	6d
Free State short, faulty and wasty	4½d	5d
Free State Karroo grown, long and well-conditioned ..	5½d	6d
Free State medium grown, light, with little fault ..	5d	5½d
Free State short, faulty and wasty ..	4½d	4¾d

Mohair —This market continues steady, but the amount of business done in the open market during the week has been small 14½d is freely offered for Firsts, but holders decline to sell, feeling confident that better prices will be obtained by waiting a little longer The demand for summer kids still continues, and about 100 bales have been sold on the open market during the week at 18d Stocks of this description have been considerably reduced, and will not exceed 300 bales, while the stock of First will now be about 1,600 bales

Superior Firsts special clips .. .	14¾d
Ordinary Firsts	14d to 14½d
Long Blue O R C Hair	14½d
Super Kids .	18d
Ordinary Kids ..	16d to 17d

Mixed Hair .	0s	11d	0s	12d
Seconds and Grey .	0s	8½d	0s	9½d
Thirds . .	0s	6d	0s	6d
Winter .. .	0s	11½d	0s	11¾d
Do Kids	0s	13d	0s	14½d

Skins —Sheepskins sold in bundles at 6⅝d per lb. ; Pelts at 4¼d ; Capes, 1s 9d , damaged, 6d each , Angoras, 7d , Shorn, 4¾d , damaged, 3½d , Goat, 11¾d ; damaged, 5¾d per lb , Springbok 8d each

Hides —Sun-dried Hides sold this week at 7½d ; and for damaged, 5¾d , Drysalted, 6¾d , damaged, 5½d, and thirds, 3½d.

THE

Agricultural Journal.

OF THE CAPE OF GOOD HOPE.

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All communications should be addressed :
"The Editor, Agricultural Journal, Department of Agriculture, Capetown."
Telegraphic Address : "Bulletin," Capetown.

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NOTES.

The Show Fixtures.

We are in the position this issue to publish a list of the Show fixtures for 1906, so far as they are settled. Some of the dates seem to clash, and this, unless altered, may cause some disappointment. Eastern and Western Shows fall perilously near each other, and in one case at least they overlap. This is a pity, and should be rectified if possible. We have not the exact date for Grahamstown or Queenstown. And we have yet to learn the date of the Bredasdorp and Caledon Shows. Will the respective Secretaries please note?

Bird Netting for Fruit Trees.

The Secretary of the Western Province Horticultural Board (Mr. C. Mayer, Stellenbosch) asks us to state that he has still some bird netting for disposal. The price is 21s. 3d. per piece of 45 yards in length by about 18 feet in width.

" Rural Cape Colony."

In the article under the above heading dealing with Oudtshoorn a couple of errors crept in which we desire to correct. In speaking of the improved tooth attached to the Martin Cultivator, we mentioned Mr. Thomas of Kammatie in conjunction with Mr. E. T. L. Edmeades as the parents of the suggestion. This should have read: "Mr. Thomas of Oudtshoorn," a different person altogether. Again, in giving the results of vine-growing at the end of the article the amount of land was given at two morgen. This should have been one morgen, thus shewing even better returns than those quoted.

Back Numbers Wanted.

We have to thank those of our readers who so kindly forwarded copies of the July issue. We now have enquiries for March, June, July and August of this year, and would fell thankful to any of our readers who could forward copies of these issues, If they are posted addressed to the Editor *Agricultural Journal*, Department of Agriculture, Cape Town, and marked "O.H.M.S.", there is no need to stamp the wrappers.

Lime and Sulphur Dip.

The controversy on the sheep dips which has run for some months in our correspondence pages has not been in vain. We have waited patiently for a farmer to apply the obviously correct deduction, and he has arrived at last. Mr. Knoblauch, in the correspondence this month, points the sound moral which now adorns this particular tale. We have had the views of the advocates of most of the better known dips, and the lime and sulphur men have steadily held their own. But in the whole discussion no one yet has so clearly summed up the case as our last contributor. As he so wisely points out, we have first to get rid of scab before we can consider any other phase of the question. It is generally admitted that for the sole purpose of killing the acari which are the cause of this disease lime and sulphur, properly used, occupies a high place. The advice then is to eradicate scab first, and this can best be done by lime and sulphur. The other points can be taken into consideration afterwards. This has been the experience of other countries where the same problem has had to be faced. Mr. Knoblauch's letter is interesting reading and should attract considerable attention.

The Stud Book.

We would remind owners of thoroughbred stock that the entries for the first volume of the South African Stud Book will close on December 31st. A good many entries have been received, and the beginnings are shewing strong signs of vitality, but a movement like this will never be successful until the farmers of the country take it into their own hands entirely and push it with all their might. We find a hesitancy about the subject in many parts of the Colony. This is to be regretted. The most valuable service a stud book can render is not to the owners of pedigree stock, but to those who need such stock. There are few farmers in this Colony to-day who know whom to turn to for first-class pure stock of any description, that is, for an extended choice. They know a few breeders perhaps, but there are dozens they do not know. A well-conducted stud book can remedy all this, and, once published, should be in the hands of every stock farmer in the country. For this reason all interested in stock farming should apply for membership and support the movement heartily. Mr. C. G. Lee, of Klipplaat, can supply full particulars.

Citrus Growing in the Eastern Province.

Mr. H. G. Flanagan's paper on "Citrus Growing," which is reproduced in this issue, is a very valuable contribution to the literature of the subject. The Eastern Province is undoubtedly a natural citrus country, and in time will produce enormous quantities of these fruits. But there are many questions connected with this branch of industry which can only be settled by the most careful observation of practical experiences. In Mr. Flanagan we have a man whose claim to be heard is, first, that he is a worker; secondly, that he is a patient and careful observer; and, thirdly, that he has achieved better results than any other grower in the Eastern Province. The orchards at Prospect Farm are models of what orchards should be. They have been established and developed by the Flanagans themselves, and are a credit to the whole country. The most pleasing feature of Mr. Flanagan's paper is where he dismisses the bugbear of over-production. This sort of thing is made a little too much of in this Colony. We are so afraid of over-production that we continue to under-produce, with the result that the over-sea producer is ousting our farmers from their own markets. Over-production soon rights itself. It is under-production that causes trouble.

Jersey Bulls for Paarl.

At the last meeting of the Paarl Farmers' Association, a sub-committee reported that the young Jersey bulls offered by the Hon. C. Köhler had been distributed as under: Jacobus van Niekerk, Achter Paarl; E Lange, Stellenbosch; W. D. Malherbe, Paardenberg; D. J. van der Spuy, Achter Paarl; D. Hamman, Lower Paarl; M. S, Louw, Babyloonstorn; J. H. Postlethwaite, Vlottenberg; and E. Read, Wellington; and the dairy farmers in the immediate neighbourhood would have the service of these bulls at a nominal charge of not more than 2s. 6d. per cow, whilst the ninth one (on Mr. Köhler's farm) would also be available, but no charge would be made for same.

Fertilizers: How to Value and Buy them.

At the same meeting Mr. G. Blackshaw, B.Sc., Agricultural Chemist of Elsenburg, delivered an interesting lecture on "Fertilizers: How to Value and Buy Them." The lecture was highly appreciated. We regret that we cannot find space for it in this issue, but hope to publish it in full in the next.

Show of Colonial Fruit in London.

At the last meeting of the Western Province Horticultural Board a letter was read from the private secretary of the Minister for Agriculture, calling attention to the Royal Horticultural Society's Show of Colonial Fruit in London to be held on the 22nd and 23rd of March next. Mr. Fuller urged upon growers to make a really fine display of only the best selected fruits. At the last Show the grapes were not a great success, but it is hoped that this year there will be an improvement in this line, as the dates are more favourable. The Royal Horticultural Society is anxious to have a good paper on "Fruit Growing in the Cape Colony," read during the Show, and published in the Press, and Mr. Fuller asked the Board to take this matter up. It was also suggested that good photographs of fruit farms and fruit trees should accompany the fruit for exhibition, as well as particulars about the farms, so as to create more interest in the Show, and as a means of advertising the Colony. In order to comply with the latter request, those interested are requested to forward notes and photographs to the Editor of the *Agricultural Journal*, Cape Town, who has undertaken to compile the paper and select the photographs to be forwarded. Large photographs would be the most suitable for this purpose.

Worms in Domestic Animals.*

In this issue an exhaustive article appears dealing with the above subject, which should be carefully read by all those interested in stock. We hear a great deal about the terrible diseases which afflict farm stock in South Africa, but it is doubtful if any of them claim so many victories in a year as do the internal parasites, which seem to flourish all over the country. Parasites are common enough the world over, and are responsible for a great deal of loss, but in South Africa they seem to have a particularly genial soil in which to thrive and multiply. One reason of this is the want of knowledge of their life habits, which is a characteristic of many interested in stock farming, and another is that their deadly work is done usually before their presence is fully realised. The most serious phase of the question is the infestation of pasturage and watering places which has been going on for so many years now, that nothing short of drastic measures can be expected to put matters right. Dams in particular are serious sources of infestation when used for watering cattle. But all this, and a great deal more, is fully dealt with by Mr. Hutcheon in the article we direct attention to, and as it is the last word on the whole subject—that is, it contains the results of the very latest investigations—we trust it will be read widely and with care.

Woolled Persians and Heartwater.

Last month, in directing attention to the importation of the long-woolled type of Persian Sheep, we mentioned the fact that one of them was tested for heartwater by the application of pathogenic bont ticks sent from the Agricultural Department, Cape Town. It was also stated that the animal showed no reaction. Now the Colonial bred Persians (from non-heartwater areas) experimented with some time ago gave good reactions. There is, therefore, an element of doubt as to the effectiveness of this test and on making enquiries of the Government Entomologist (Mr. C. P. Lounsbury) he more than confirmed this view. He says: "This failure to react indicates one of two things, either that the animal has complete immunity or that the ticks employed were innocuous specimens. The ticks were thought to be reliably pathogenic when they were sent to Mr. Dixon, the Veterinary Surgeon, but the results of the attempts at injections with the lot from which they were taken throw grave doubt on their reliability. We have records of the use of specimens on ten merinos, three goats and this Persian. Seven of the merinos only reacted with certainty and only one died. None of the three goats reacted, though all are believed to have been susceptible, and this Persian failed. Thus seven animals have given reactions and seven not! We have no explanation to offer for the unreliability of the ticks, and can only suggest that the sick animal off which they came may have been in fever for a short time before its blood became virulent. This fever was continuous but the high temperature at its onset might have been due to a cause distinct from the heartwater infection, and thus we have got pathogenic mixed with non-pathogenic ticks."

"As matters stand the test of this Persian is not reliable, and in view of the public interest in the matter, we feel this fact should be made known. The animal should be retested with ticks and the test controlled by applying ticks of the same lot to animals known to be susceptible. If the Persian gave no reaction and the controls died, it would be advantageous to then subject it to an intravenous inoculation of 5 c.c. of virulent heartwater blood. Such an inoculation would be quite safe if the animal were immune (as the failure of the ticks to infect would indicate), and would remove the last thread of doubt."

Co-operation.

The tour of Mr. P. J. Hannon, the Co-operative Expert, in the company of the hon. A. J. Fuller, Minister for Agriculture, has proved, so far, one of the great features of the present season to agriculturists of all classes. Mr. Hannon has, according to all accounts, installed himself as a favourite with all sections of the community and it may be safely asserted that he will not be soon forgotten. This is largely due to the individuality of the man. But Mr. Hannon has a deeper purpose than that of merely ingratiating himself with the people. He has come to this Colony at a most critical period. In the history of every country crises arise, and the great crisis in the progress of this Colony is undoubtedly with us at the present moment To trace it to its source is unnecessary. As a community we are called upon to decide upon a course of action that must have far-reaching effects on our future. In a word the country is face to face with the duty which devolves upon all men—that is to make the best of its natural advantages. And to do this in a country like South Africa, it is not only necessary for each to do his best individually but to seek out his neighbour and work with him for the general good as well.

Mr. Hannon's creed is founded on the gospel of self-help. His great advantage is that he does not content himself with theories, but has authenticated facts and personal experience to back up his arguments. There is scarcely a farming industry in the Colony which could not be improved by co-operation among those who follow it, and there are many that languish for the want of it. That which must strike all who have given attention to this subject is the great importance which has to be attached to the small things. In the economy of South African farming the lesser cultures are invariably neglected. And why? Mainly for the want of organisation. In the schemes outlined by Mr. Hannon the small things grow into matters of importance, the apparently neglectable points develop into essentials. And he has the peculiarly happy knack of shewing in a few words the economic folly of overlooking these small matters. It must, however, be recognised at the outset that there is some difficulty in convincing our people, who have always looked upon farming as a matter of broad acres and production on a large scale, of the necessity of considering the altered conditions which have arisen.

The most encouraging feature about the movement, so far, is the fact that Mr. Hannon is impressing the people with the seriousness of his views. His sound, business-like statements appeal to them, and now that they begin to see that this co-operation is no mere theorising but a matter of potential profits, there is every hope of a successful outcome. The one industry of poultry alone, properly handled on an organised basis, is capable of great developments and excellent profits to the farmer provided producers will limit their ambitions to small profits on a large turnover. But the greatest blessing that could come to this Colony at the present time would be a well-organised dairy industry. To conduct co-operative creameries with profit, the members must prepare themselves to maintain a regular supply of cream, to do this the milch cattle will need more attention than they get at present. That will have to take the form of better feeding and the raising of crops to be kept in reserve for times of scarcity, as well as the conservation of the natural pasturage. This alone is calculated to revolutionise agriculture in many districts of the Colony. And anyone who doubts whether it pays to go to so much trouble should consult with those who have tried it. The Darling farmers could answer such a question without hesitation, for the Darling creamery speaks for itself. And it is not as though the markets were limited. The imports of butter, cheese, cream, poultry, and even eggs, tell their own sad tale.

Cattle Dip Improvements.

The sketches and notes published in another part of this issue giving suggestions for improving cattle dips will be noted with

FARM AND VELD.

The Weather.

More rains have fallen in the Eastern Province since our last, and again with disastrous results in some places. But the damage done by the late rains was very little compared with that done previously, especially in some of the coastal districts from Knysna, and George onwards to the Gamtoos and even further East. The Gamtoos floods have washed away hundred of acres of excellent orchard lands and with these some thousands of fruit trees. In addition to this, over a dozen pumping engines were washed away—all used for irrigation purposes—crops and stock swept off and homesteads levelled with the ground. The loss here is very great indeed and many of the farmers are practically ruined.

Further East the Sundays River rose very high and threatened to greatly damage the irrigation works and farms so thickly dotted through the valley. But beyond a few acres of lucerne and garden crops here and there we have heard of no serious losses. The Zwartkops River too was very high for a long time, but the damage is comparatively slight. The Buffalo at East London has eclipsed all known records. While on Thursday 12th October, the Great Fish River at Trumpeter's Drift was fuller than it has been since 1874. We may safely assume that the drought has broken at last.

In the Oudtshorn District the floods played havoc. Hundreds of morgen of the most valuable irrigable lands have been swept away and, it is feared the damage in many cases is beyond repair. One farmer we learn has lost some thirty morgen from one farm, and six to seven morgen from another, besides furrows and fences damaged beyond hope. Others, we understand, have suffered just as severely.

The Northern Districts, however, could, at the time this issue went to press, still do with more rain, particularly towards Bechuanaland. The cereal crops in parts of the West and South West were very backward at the beginning of last month, but since then the much-needed rains have fallen. August was a very dry month in the Western Province. Unfortunately the late rains have been accompanied by strong gales which almost flattened the crops in some of the more exposed places. However, with a recurrence of fine weather the prospects all round are brightening.

New Mealies for Trial.

With a view to introducing better sorts of mealies, the Department of Agriculture is importing small quantities of several specially selected varieties of mealies for trial in the Colony. To such farmers as apply, small samples will be sent free, conditional only on a report as to the success or otherwise of the experiments being sent to the Agricultural Assistant, Cape Town. The mealies are expected to arrive shortly and those who wish to try them are requested to make early application. Farmers should be careful to keep these mealies separate from their ordinary mealie crops to prevent as far as possible cross-fertilization from taking place.

The following notes give the leading characteristics of the mealies.—

Pedrick Perfected Golden Beauty.—An extra large bright yellow mealie containing 12 to 16 rows on each cob. Said to be a vigorous grower and to give a maximum measure of shelled grain. The ears are easily shelled although the grains are firm on the ear.

Snow White Dent.—A deep grained white mealie maturing in from 100 to 115 days from planting. Plants grow 7 to 8 feet high and bear 1 to 2 good ears each, said to produce a very large quantity of shelled mealies.

Leaning Improved. A productive golden yellow variety, very popular in America. Ears long with small red cob and well filled with medium sized grains. Has a strong vigorous growth and is said to make a good crop even in dry seasons. Ripens in 100 to 110 days. The stalks are leafy and make good fodder:

Cinquantino. This variety as its name implies is a fifty day mealie. It is an Italian variety and has a good reputation amongst farmers in certain of the southern provinces. It is not a tall grower but rather squat and spreading. On account of its very early maturity should prove a good forage crop for dairy cattle.

Wisconsin White Dent. An early deep rooted variety with a reputation for withstanding drought.

Thoroughbred White Flint. Of rather a spreading habit. Stools freely and by reason of its broad leaves and small stalk recommends itself for both fodder and ensilage.

In order to meet the demand not more than two varieties will be sent to any one applicant.

Salt Bush Seed.

Samples of *Salt Bush* seed for experimental trials may be obtained now. Very favourable reports are constantly coming to hand regarding this valuable grazing plant and as it is pre-eminently suited to brak soil and a drought resister, it should prove a very welcome addition to the natural herbage of such spots where little else will thrive. For fuller information concerning Salt Bush those interested are referred to the article on the subject in the *Agricultural Journal* of March 1905.

Setting Out Lucerne Beds.

The conditions guiding us in fixing upon the size, shape, and slope of lucerne beds for irrigation (writes Mr. C. E. Lawford, of Mortimer—"Apex") are:—(1) The amount of water per minute at our disposal and (2) the nature of the soil, and the slope of the ground. To-day all up-to-date irrigators are agreed that spading the water about lands, or "wild flooding," as it is termed in America, is expensive in labour, extravagant in water, and frequently unsatisfactory in results, and cheaply made banks are necessary to guide the water where we will have it.

The Size of the Beds.—It is clear that this must generally bear some proportion to the water supply, for a small stream would soak deep at one end of a large bed and never get to the other end; and, on the other hand, a large stream turned into a small bed would require too frequent attention in passing it on to the next. The nature of the soil also must be considered, for, if sandy, then a comparatively large flow must be rushed over quickly to prevent waste, whereas a soil, either brak, clayey, or from any cause difficult to saturate, would require 24 hours, and sometimes much more, to give the best results.

The Shape of the Beds.—Square beds contain, in practice, the greatest area for a given length of banks; they are at their best when the ground is dead level, or nearly so; but, probably, the beds most generally suitable for our purpose are those set out on "contour lines" (now coming into use in lucerne growing countries), that is, with banks more or less across the slope, not necessarily straight, but always level, or nearly so, from end to end; as, when properly proportioned, they give an absolutely uniform watering of any amount, and require a minimum of work in their construction. In the past, most of our irrigators have been wheat-growers, but to-day conditions are altered, experience having shewn them that they cannot profitably continue this calling. The prevalent system was to run the beds in the direction of the greatest slope, provided that they were not so steep as to wash out. These sharply-inclined beds, owing to the crops being shallow-rooted, admitted of a sufficient soaking in the short time the water was allowed to run through, and there was a prevalent opinion that surplus water running off at the lower end, carried with it the salt in solution, and so reduced the brak. This is true on hard-baked ground, free from cracks, but after cultivation the brak is carried down into the soil before there is any discharge from the lower end of the bed, and experiments shew that the average percentage of brak disposed of in this way is very slight, and that where it exists we must employ other and more effective methods if we are to combat it successfully.

To-day our most enlightened farmers are growing lucerne, having realized that in it are their largest profits with least labour. This naturally deep-rooted plant is, in practice, very much what we choose to make it. With deep waterings at long intervals the roots will follow the moisture, but with frequent shallow waterings they are attracted to the surface, and will not then prove drought-resisting. To bring it to maturity in the shortest time and to make it as much drought-resisting as possible, the moisture must at every application extend below the roots. To saturate the soil to this extent, where the lucerne is old established, we must either have dead level beds where we can impound six to nine inches depth of water, or we must extend the time during which the water is running through the sloping beds. In making the choice we must remember that we want to reduce the number of surface waterings, and by selecting the former (level beds) we are enabled to shut in the heaviest thunder rains, instead of allowing them to run off as from the steep beds, to swell our torrential rivers.

The writer experimented on his own lucerne on a sharp slope, with dead level beds running lengthwise across the slope, properly banked, and with leading furrows (running down the slope) at each end of the beds, fitted with cheap sluices so that the water can run through the top bed into and down the furrow at the far end; then through the second bed to the first furrow, and so on. This appears to be altogether successful. It will be noted that any considerable excess of water on the beds can be drained off through these leading furrows, if unobstructed, for it is necessary to have an escape for water from all beds. No greater mistake can be made than to suppose permanent lucerne lands won't pay for the expense of the levelling. The saving in water, and the labour of leading alone, will do this, to say nothing of the much more even and heavier crops obtained. At present we do much of the banking by hand, but it would not be a difficult matter to design a really serviceable "banker" at reasonable cost, and thus materially reduce our labour bill.

Bitter Karoo.

Complaints are reaching the Department from various parts of the Colony but more especially from the regions of grass veld of the spread of that pernicious weed known commonly as the bitter karoo, and to botanists as *Chrysoma tenuifolia*, Berg. From Barkly East comes the cry that already the stock-carrying capacity of many farms has been reduced by one half, and that the pest is spreading. A competent observer, who for obvious reasons shall be nameless, writes that this serious state of affairs "is due to large overstocking and careless or lazy farming in denuding either the whole or a portion of the veld entirely of grass." This view is emphasised on looking at a farm which is carefully managed and yet is a wedge between two farms over-run with bush. As long as the grass is maintained the bush has absolutely no chance of establishing itself, which it does first on sloping ground upon which wind and rain have so great an effect when the grass has been eaten off. Shortly the bush is a secondary cause of injury, and over-stocking is the first cause.

The suggestion is made that this plague might be destroyed by the use of chemicals, but it is to be feared that this is impracticable since any poison would probably be at least equally destructive to the more valuable and tender grasses and herbs growing amongst the bitter karoo. Any grass which would be so luxuriant as to kill out the shrub would certainly proceed even more rapidly to replace the natural and original grasses, or, if relished by stock, would never be given the chance of establishing itself in doing its work. Assuredly no better plan can be adopted than the encouragement of our own local grasses by letting the veld run to seed and perhaps by artificially assisting the burying of that seed by light harrowing, but above all by resting the veld and giving the grass a chance to repossess the ground.

Writing on this very subject several years ago Professor MacOwan says: "Pulling up the plant by hand before it flowers and sowing a pinch of Pentzia seed in its place is the only mode I can suggest for extirpating this pernicious weed. In gebroken veld, seeds of *Anthesteria* might be suggested." In the first instance the Professor is referring to Karoo veld, Pentzia being the well-known "goede karoo" while *Anthesteria*, recommended for mixed veld, is our common "rooi-gras" *Anthesteria ciliate* (Retz.) and is of course equally applicable to pure grass veld which is now also over-run with bitter karoo although this does not seem to have been the case when the lines quoted above were penned. In brief the cause of the trouble is no doubt over-stocking, the cure suggested, rest, removal by hand of the bush before it flowers, and encouragement of the seeding out of the natural local grasses. No magician's wand can exorcise the plague, hard manual work will no doubt do it.—E.A.N.

Plum Tree in the Veld.

Mr. O. Briggs, of Maudesley, near Herschel, writes :—I send a photo. of a tree which may be of interest to your readers. It is a Magnum Bonum Plum grafted on a peach seedling, and has been bearing profusely for many years. You will notice that it is not in an orchard, but simply in the veld, and has had no manuring or cultivation since it was grafted. In the picture you will notice that the tree is coming into blossom, but not fully out. The stones at the foot of the tree were placed there to keep down evaporation. The rocks to the left of the tree were there when the peach stone was planted and thus served to prevent cattle treading on the seedling. The tree has been allowed to have 6 or 8 feet of bare trunk before the branches come out, this was to have the fruit out of the reach of cattle &c. It has been said that in some parts of the Western Province the domestic

plums are not good bearers. The elevation of this tree, above sea level, is about 5,000 feet. The photo. was taken by Mr. Fred Keir Brigg of Herschel.

A Record Milker.

A Port Elizabeth correspondent writes:—As an instance of phenomenal milk production my attention has been directed to a cow in the possession of Mr. J. McWilliams of Manor Hastings, Walmer, This is a cross bred Friesland, commonly known in the Eastern Province as a Cape Cow because of the preference of Peninsula breeders for that particular strain. The cow in question has been in full milk for the past five years, not having once run dry despite efforts on occasions to induce cessation of milking. She has calved about every fifteen months and for five months after each calf has given an average of 33 bottles (equal to say 5½ gals.) of milk per diem, during the second five months her milk production continues at the rate of 25 bottles daily At the present time, twelve months after calving the cow is still yielding 22 bottles of excellent milk. Indeed a feature of this remarkable animal's capacity for milk supply is the extraordinary richness of the product. A heifer bred from Mr. McWilliams's cow was recently sold for £41 to Mr. R. J. Berry a prominent dairyman in Port Elizabeth and is now milking as a four year old, to her second calf.

TREATMENT FOR WORMS IN DOMESTIC ANIMALS.

By D. Hutcheon, M.R.C.V.S., Acting Director of Agriculture.

(Republished with corrections)

In treating our domestic ruminating animals—which have four stomachs—for worms, the principal difficulty consists in getting the vermifuge medicine to run directly into the fourth stomach, without being considerably reduced in strength by previously mixing with the fluids in the first and second stomachs.

Many writers refer to this as being a very simple matter, and confidently state that it can be accomplished by pouring the medicine slowly down the animal's throat, when it will trickle down the œsophageal groove direct to the fourth stomach. Experience does not bear out this assertion, for however carefully and slowly a fluid is poured down a ruminating animal's throat, a variable proportion of it finds its way into the first, second and third stomachs.

"Flourens proved by making fistulous openings into all four stomachs, that immediately on the animal drinking, the fluids entered all four stomachs simultaneously." If it were the case that fluids drunk by a ruminating animal did not find their way into the first and second stomachs, it would be difficult to account for the quantity which is invariably found in these compartments. Besides, a certain quantity of fluid in the first stomach is essential to rumination; it would be impossible for these animals to "chew the cud" if there were no fluid in the first and second stomachs. If you listen attentively to an animal ruminating, you will hear a sort of gurgling noise as of fluid rushing up with each bolus of food in its passage from the first stomach to the mouth, and returning as soon as the bolus had entered the mouth. These facts shew that it is not such a simple matter as it is sometimes represented, to pour fluid medicines down a ruminating animal's throat, so that they run direct into the fourth stomach; hence the difficulty of killing worms whose situations are in the fourth stomach or bowels, unless the stomachs have been previously emptied by a long fast.

In the case of young calves, lambs and kids, it is comparatively easy to get fluid medicines to run directly into the fourth stomach, because that is the only stomach which is fully developed in these young animals at birth. Nature has arranged that these young ruminants should live solely on a purely animal fluid—their mother's milk—for some weeks after birth, consequently she made no provision for the maceration and digestion of coarse vegetable food—which is effected in the first three stomachs—at that early period of their life. If these young animals are, therefore, subjected to a moderate fast before being dosed for either tape-worms or wire-worms, the medicine reaches the fourth stomach almost direct, and it is no uncommon experience to witness the expulsion of tape-worms from these young animals a few hours after the medicine has been administered.

MEDICINES USED IN THE TREATMENT OF TAPE-WORMS.

(*a.*) The liquid extract of male fern is a very effective remedy for tape-worms. Lambs and kids require about half-a-teaspoonful calves a full teaspoonful, dogs ten to twenty drops, according to size, ostriches from a teaspoonful for a chick three or four months old to a tablespoonful for a full grown ostrich. It may be mixed with a little oil or milk for calves or lambs, or made into a pill with flour for ostriches, but it is more prompt and effective in its action when given in a liquid form.

(*b.*) Turpentine is another very effective remedy for tape-worms. Calves require a tablespoonful, lambs and kids a teaspoonful, dogs twenty to forty drops, ostriches from a dessertspoonful for a chick about three or four months old, to two tablespoonfuls for a full grown bird. *See below.*

Turpentine acts much more effectively, especially in ruminants, when combined with a purgative, such as raw linseed, or castor oil. Unless the bowels act freely, the turpentine, being very volatile, may pass out by the kidneys and lungs, and thus fail in expelling the worms.

(*c.*) *Powdered Kamala.*—" This is a dark ochre-coloured powder, consisting of minute glands and hairs obtained from the surface of the fruits of *Mallotus philipinensis Müll Arg.*" (Lauder Brunton). I experimented with this remedy on ostriches in 1886, and on lambs and kids in 1887. It may be given mixed in a little milk or water or it may be made into pills with a little flour or water. It is a little difficult to mix it nicely with water, as it is very light—you require to make it into a fluid paste first, then add your water and keep stirring. It costs about three shillings a pound. One pound would dose about eighty lambs, or sixty one-year-old sheep. The dose for a lamb or kid is a full teaspoonful heaped. Calves fully twice that quantity; dogs half a teaspoonful to a full teaspoonful, according to size and age.

(*d.*) *Areca Nut Powder*—This is one of the most effective remedies for tape-worms in dogs, but it has not been used so largely in herbivorous animals. The dose for a dog is from fifteen to sixty grains, or, as Mayhew observes, about two grains for every pound the dog weighs. I have not given it to calves; lambs and kids take about sixty grains, but its use is generally confined to dogs in veterinary practice.

(*e*) *Pomegranate Root Bark.*—A decoction of this acts very effectively on ostriches affected with tape-worms, but it requires to be given in large doses, and followed by a purgative. I made some experiments with it during 1887, but the quantity required makes it somewhat expensive. I have not used it on lambs or kids.

Cooper's Dip is a compound containing arsenic, and has established itself in the confidence of the farmers of the Colony as an effective remedy for the expulsion of tape-worms in lambs and kids, and many have used it with equal success in calves and also in ostriches, although an occasional mishap may occur from want of care in measuring the dose carefully. It may be as well to repeat the following information supplied by Juritz, with respect to the weight of an average full teaspoonful of Cooper's dipping powder and the proportion of arsenic which it contains. He says:—"The weight of Cooper's Powder contained in an average teaspoonful is 135 grains, of which, according to analysis made, about 24 grains would be arsenious oxide and about five grains arsenious sulphide, or very nearly 29 grains of white arsenic—arsenious oxide."

A teaspoonful of Cooper's Powder contains the dose generally given to ten young sheep, which is practically three grains of arsenic each; a full-grown sheep may get four grains. A tablespoonful would be four teaspoonfuls, or roughly 120 grains of arsenic sufficient for forty sheep. Two tablespoonfuls, 240 grains, sufficient for eighty sheep; and if that amount is dissolved in one gallon of water, which is 160 ounces, that would make each dose for a young sheep two fluid ounces, or a wineglassful. Lambs under three months should only get half that quantity; three wineglassfuls of such a mixture would be a sufficient dose for a horse. Experience shows that calves under three months old should not get more than the dose given to a sheep, and when only one month old, no more than is given to a lamb.

I may just remark that when Cooper's Powder is mixed with salt and given dry in the mouth, there is ordinarily a proportion of it wasted, hence the dose is not so certain. On this account many farmers give Cooper's Powder alone unmixed with salt. The dose is carefully calculated, which can easily be done by dividing a teaspoonful into ten equal portions, and observing the amount of the dose when placed on the point of a broad blunt pocket-knife. The dose is taken up on the point of the knife, a boy opens the sheep's mouth, the knife is inserted into the mouth; turned over, and the powder left on the back of the tongue. For lambs and kids this is much the simplest plan, and if they have been well fasted before, they may be allowed to go direct to their mothers to wash the powder down. Sulphur is easier to mix with Cooper's Powder than common salt, it sticks better in the mouth, and is fully as effective.

Arsenic, when administered to a horse in small repeated doses, not only effects the expulsion of worms, but it also exercises a tonic and astringent action on the mucous membrane lining the stomach and bowels; hence it not only expels the worms, but it induces a healthy condition of the digestive organs which renders the horse less liable to become re-infested with worms.

As an illustration of the beneficial effects of repeated small doses of arsenic, I will relate the particulars of the following case: In the beginning of 1887, on my return home after an absence of about two months, I found one of my horses looking very thin and hide-bound. On examination, I could not detect any indications of disease about him, so I concluded that his sudden falling off in condition was due to worms. He was a veld-fed horse when I purchased him about six months previously.

I had been experimenting with arsenic on sheep for worms a short time before this. I therefore, gave the horse a tablespoonful of the Liquor Arsenicalis three times a day in his food. The worms began to pass away from him on the evening of the second day after commencing the medicine, and continued passing until the end of the fifth day. During those three days he passed 335 of that large round worm which tapers to each end, called the *Ascaris megalocephala*, so common to horses, and occupying the stomach and small intestines. along with an immense number of the small round worms found in the large intestines, which I did not count. I continued the Arsenicalis on the sixth day, but as no more worms passed I discontinued the medicine, and the horse rapidly improved in condition. During the six days this horse had taken about 60 grains of arsenic in solution, and was very much improved in every respect by its administration. Would he have benefited in like manner if the whole or even half of this amount had been given at once? I am satisfied that he would not.

Sulphate of Copper or Bluestone.—This has been a favourite remedy for round-worms in horses since my earliest recollection. An old veterinary surgeon, with whom I saw my first practice, used to tell me to give a horse infested with worms two drachms of sulphate of copper every morning for a few days, and I would never hear any more of the worms. It is now well known as a very effective remedy for the destruction of wire-worms in sheep and goats, but it acts equally well on tape-worms in young ruminants, such as calves, lambs and kids. Some years ago I experimentally dosed some calves with it which were affected with tape-worms. The calves were about six months old. I gave them half-a-drachm each of sulphate of copper dissolved in half a pint of warm water, on an empty stomach, and observed that the tape-worms began to be discharged about five hours afterwards. It is worthy of note that I made the sulphate of copper solution with more than twice the quantity of water that is generally used, and I am of opinion that when using sulphate of copper as a remedy for the destruction of tape-worms in ruminants that it is of very great advantage to do so.

Stockholm Tar.—I have tried the effects of Stockholm Tar for the destruction and expulsion of the stomach wire-worms of sheep and goats, and found that it appeared to kill them, when given in large doses. I gave two sheep of a flock, which were badly affected with these worms, two tablespoonfuls each of Stockholm tar, and found that it did not exercise any apparent ill effects on the sheep themselves. I had them both killed 24 hours after dosing them, and I was very pleased with the action of the tar. Not only were the worms dead, but the mucous lining of the stomach and small intestines presented a very clear, and an unusually healthy appearance. It has since been tried in smaller and repeated doses, with manifest beneficial effects. The doses used are a teaspoonful for a lamb or kid, and a tablespoonful for a sheep or goat.

Common Salt.—Many farmers and others are of opinion that strong solutions of common salt when properly administered, to sheep and goats kill these wire worms in the fourth stomach. As will be seen further on, I have been unable to verify that opinion, even when the utmost care was taken in administering the dose.

Common salt is undoubtedly one of the most effective preventives of internal parasites, because it is essential to complete and healthy nutrition; it enters largely into the composition of every tissue and fluid of the animal body, but it cannot be relied on to effectually kill these internal parasites when they have got possession of the sheep, at least not in single doses by itself. The late Professor Thomas, of New Zealand, when conducting his investigations on the Fluke-worm, *Fasciola hepaticum*, for the Royal Agricultural Society of England, during 1880-1882, proved that weak solutions of salt or lime killed the ova of these parasites, in the form in which they are taken in by the sheep while grazing, thus proving the value of these ingredients when given regularly to sheep when grazing on tainted pastures. These facts indicate that much may be done with salt and lime as preventives of parasites, by placing them where the stock drink, or spreading them on limited marshy areas infested with the ova of these parasities.

Lime.—A considerable number of sheep farmers have great confidence in the efficacy of Lime as a *cure* for worms in sheep, especially the wire-worms. I cannot confidently support this claim, because in the numerous experiments which I have made with it, even in large doses I have found the worms still alive in the stomach, when a post-mortem examination is made twenty-four hours or more after the dose was administered. There can be little doubt, however, that lime either given alone, or in combination with salt, is an effective preventive of wire-worms. A favourite and effective mixture is :—

Powdered	Common Salt	6 parts,
„	Slaked Lime	1 part
Flowers of Sulphur		1 „

To be thoroughly mixed, and given as a lick.

Another excellent method is to place lime in the dams and drinking places on the veld, or better still to fence in the dams, and draw the water into troughs in which lime is always kept, and renewed when necessary.

TAPE-WORMS.

With respect to the origin of tape-worms; all tape-worms require an intermediary host in which they pass what is called their larval or cystic stage, and the great majority of the tape-worms which infest man and carnivorous animals pass their intermediary or cystic stage in one or other of the herbivora; the flesh of which is eaten by man and the carnivora, hence the infection.

But the intermediate hosts or bearers of the tape-worms which infest the domestic herbivora themselves, have not been worked out yet, but judging from analogy it is most probable that some of the external parasites which live on the domestic herbivora themselves, such as lice, fleas, or ticks, play the part of intermediary hosts to these tape-worm larvæ, and thus it may happen that when the lamb, kid, or calf bites or licks off the parasite which is irritating its skin, it swallows with this parasite the cyst of a tape-worm which becomes fully developed in its intestines. It is in this manner that the dog becomes infested with the *Tænia canina vel cucumerina*. The louse (*Trichodectes latus*) and the flea (*Pulex serraticeps*) of the dog play the part of hosts to the larvæ of this tape-worm, and the dog when hunting for these skin parasites swallows them, and the larvæ of the tape-worm which they contain, and so becomes infested with the latter.

It is well known fact that kids often become seriously affected with tape-worms, before they have been allowed to leave the kraal. So early has this been observed sometimes, that many farmers have asserted that the kids must have been infested with these tape-worms before birth, having got the infection from their mothers. This is not the case, but it is very evident that the infection is abundant about the kraals, and is readily accessible to the young animal at a very early period of its life. In this way I could easily understand how kids would be more liable to become earlier infected with tape-worms than lambs, as the latter would only nibble at the tops of the vegetation on the veld, and stand less chance of infection; while the kids in their confinement would be picking up all sorts of things in the kraal, both from a craving for something to exercise their stomachs, and perhaps also from having nothing else to do, and so take in the host, whatever it is, which contains the cyst of the tape-worm.

THE *Strongylus Contortus*, OR TWISTED STRONGYLE.

This is the most common round, or "*wire*-worm," which is found in the abomasum or fourth stomach of sheep, goats and cattle. This worm may be found in all stages of its growth in the stomach. When examined immediately after the death of a slaughtered sheep, they may be detected adhering by their heads to the mucous membrane. Later they fall into the stomach contents, where they can be seen wriggling about. They are then of a reddish-brown colour, due to the fact that they live on the blood which they abstract from the mucous membrane. "Its spiral or twisted appearance to which it owes its name is due to the arrangement of its ovarian tubes which are rolled around the intestine to form regular loops; the white colour of which contrasts with the dark tint of the digestive tube."

"According to the investigations of C. Baillet, the *Strongylus Contortus* is ovo-viviparous" (that is the embryos are already formed in the egg before the latter is discharged from the parent worm)—"and the rhabditiform embryos it produces will not develop in pure water, but die in the course of a few weeks. Leuckart has seen them grow rapidly in muddy water, however, and after several moultings reach a state of development in which they were capable of being completely perfected in ruminants. It is, therefore, probable that sheep are infected by drinking water soiled by the excrements of animals which are bearers of the strongyles. (Neumann).

Moisture is essential to the development of all organic life, and it is pretty well established that our system of watering stock with dam water, which is necessarily saturated with the different parasitic ova, or embryos, which are prevalent amongst them must be one of the principal sources of infection. But it is equally certain that all moist places scattered over the general pasture, may also become the breeding grounds of all animal parasites, which do not require to pass through an intermediary bearer, such as the majority of the *strongyli.* They are also the breeding ground of the intermediary bearers of many of those worms which require an intermediate host, such as the different varieties of *fluke.* It is evident therefore, that in adopting measures for the prevention of these worms—whether *strongyles* or *fluke*, the purifying of the water supply, and the draining of all marshy places should receive primary consideration.

A Brief Description of Our Experience in the Treatment of the Stomach Wire Worm of Sheep,—*Strongylus Contortus.*

In 1881, I first tried the effect of some of the more popular remedies, such as common salt; saltpetre; sulphate of iron; turpentine; and a mixture of lime and water, on these worms, immediately after removing them from the stomach. In these experiments I found that a solution of a mixture of common salt and saltpetre of the strength of half an ounce of common salt, and one drachm of saltpetre, dissolved in six ounces of water, killed and shrivelled up these worms in five minutes, while a solution of one drachm of sulphate of iron in six ounces of water took forty-five minutes to kill them; and a mixture containing a strong dose of turpentine a like period. A solution of common salt alone. or a mixture of lime, did not act on these worms satisfactorily. Subsequent to this I dosed a large number of flocks with the above mixture of common salt and saltpetre, but I was very much disappointed with the results obtained. The solution when poured direct into the stomach of a sheep, slaughtered for the purpose, killed these worms promptly, but when administered to a living sheep the solution appeared to become greatly diluted and weakened before it reached the fourth stomach, however, carefully and slowly administered. I then tried the following mixture;—common salt a tablespoonful, and carbolic acid 15 to 20 drops dissolved in six to eight ounces of warm water. This mixture appeared to act more effectively but it was not satisfactory, besides sheep and goats exhibited a strong objection to swallow it, hence accidents in dosing were apt to occur. I also tried Fowler's Solution of Arsenic, and, in a tentative manner, a weak solution of sulphate of copper. Subsequently, early in January 1891, I was called upon to examine a flock of goats in the Graaff-Reinet district, which were severely infested with these stomach worms. I considered the opportunity favourable for a further test of some other popular remedies. In this flock there were 25 goats which were very bad and had been removed from the flock. Of these I selected 8 of the worst looking cases, and after fasting them for fifteen hours I dosed them with the following mixtures respectively —

No. 1 received 40 grains of sulphate of copper in 4 ounces of water.
" 2 „ a full teaspoonful of quick lime in 12 ounces of water.
„ 3 „ a teaspoonful of creolin in water.
„ 4 „ one-third of a teaspoonful of Cooper's Powder in solution
Nos. 5, 6 and 7 received the ordinary dose one ninth part of a teaspoonful of Cooper's powder.
No. 8 received one-third of a teaspoonful of Cooper's powder laid on the tongue dry.

No. 1 was killed the same afternoon, and the stomach carefully examined; only a very few worms were observed, and these were dead and bleached looking.

No. 2 was killed immediately after No. 1, but the worms were still alive and apparently not affected.

No. 4 was also killed the same afternoon, and on examination *there were still a great number of worms alive in the stomach*, apparently unaffected; there was evidence that some had been killed.

No. 8 was killed the following morning, 24 hours after being dosed. An examination of the stomach revealed a large number of the worms still alive.

Nos. 3, 5, 6 and 7, were then dosed a second time with the same mixtures as previously, but in increased quantities.

No. 3, dosed with creolin, began to exhibit symptoms of acute pain in the stomach, it was, therefore, killed a few hours after receiving the second dose, but the post-mortem examination revealed the worms still alive in great numbers.

No. 5 was killed twenty-four hours after receiving the second dose, but on examining the stomach, I found a large number of the worms still alive. I did not kill Nos. 6 and 7, as it was evident that Cooper's Powder did not kill these worms satisfactorily even when given in large doses.

I then selected nine other goats out of the original twenty-five, and for these I dissolved 6 drachms of bluestone in 36 ounces of water, and to each goat I gave 4 ounces of the solution. That was 40 grains of bluestone to each goat. Twenty-four hours after dosing them I picked out the worst looking one of the lot, had it killed and carefully examined the stomach, and was very pleased to find that there was not a single living worm left. I did not consider it necessary to kill any more of the remaining eight goats that were dosed.

There was no apparent inflammation of the mucous membrane of the stomach of the one goat killed, and the remaining eight goats, gave no indications of abdominal pain or disturbance after the dose. The farmer immediately afterwards dosed the whole of his infected flock of Kapaters with a solution of bluestone of the strength of one pound of bluestone to twenty quarts, or 31 bottles of water, giving them 4 ounces each of the mixture containing 38 grains of bluestone. No fatal results followed, and the goats appeared to be greatly benefited.

It very soon became evident, however, that goats, especially full-grown Kapaters, could stand a much stronger dose of bluestone than sheep, more especially lambs, hence it became necessary to reduce the strength of the dose.

On the 15th of February following, I dosed 400 lambs, and 23 rams belonging to a farmer in the Cathcart district, with a solution of bluestone of the strength of one pound to twenty quarts of water. The lambs were from 4 to 5 months old, and received 1¼ ounces of the solution, and the rams 4 ounces.

Two of the lambs died the same night, and several of them manifested symptoms of having had an over-dose. Ultimately 30 lambs died and one young ram, about 15 months old.

I then made up a solution of bluestone, of the strength of one pound to 24 quarts, or 37 bottles of water, containing *8 grains* of sulphate of copper to the ounce, and dosed 1,400 sheep ewes, giving them 3 ounces each of the solution. One or two sickly ewes died, and one was killed by some of the fluid going down the trachea.

Shortly after this, Veterinary Surgeon Soga reported that he "had been engaged at Waterford, Kabusie, from the 6th to the 24th March, dosing sheep for wire-worms. In all about 9,000 sheep and lambs were dosed satisfactorily. The dose administered was that recommended to me by wire from the Colonial Veterinary Surgeon. We eventually increased the dose to 17½ ounces of Sulphate of

Copper to 24 quarts of water, or 37 bottles of water, the strength of the mixture being 9½ grains to the ounce. The dose given was sheep 4 ounces, lambs 2 ounces." Mr. Soga adds that "Mr. Bodden, the stockman, is so pleased with the results, that he has commenced to dose the rest of the Waterford flocks."

In the month of May following, I was in the Hopetown district, where the stomach wire worm of sheep was very prevalent. I obtained permission from two farmers, Messrs. Cilliers and Viljoen to dose their flocks. The one flock contained 1,200 sheep, and the other about 1,000, of different ages. The flocks were badly affected and very poor. so I made the strength of the bluestone solution one pound to 24 quarts of water, which is 8 grains to the ounce. To sheep 18 months and over, I gave 4 ounces of the solution; 12 to 15 months 2½ ounces; lambs 6 months and over, 1½ to 2 ounces; lambs 4 to 6 months 1 to 1½ ounce.

Further, I felt so confident regarding the safety of the dose that I picked out 200 ordinary ewes, which were suckling young lambs, and I gave these 5 ounces each of the above solution. I measured the doses, and administered them myself. These ewes were kept in the kraal until after midday: I watched them after they were let out. About 20 did not feed very much and twelve lay down the most of the afternoon. They were all right the following morning, however, and not a single fatality occurred in either of these flocks. I observed the droppings which the 200 ewes passed the following morning. These were thinner than natural, and of a dark bluish colour, and contained a little mucus—indicating that the dose of 5 ounces of that strength of solution was dangerously near the maximum, and should not be recommended. But I felt quite confident that the strength of the solution and size of the dose administered to the general flocks were quite safe if proper care was exercised in the preparation of the solution, and the measurement of the dose.

STRONGYLUS CONTORTUS, Rud

Fig. 1. Adult female, ×6 *a*, head, *b*, ovaries wound around the intestines; *c*, *c*, uteri: *d*, a large papillæ, just in front of and covering the vulva, *e*, anus.

Fig. 2. Adult male, ×6

Fig. 3. Head: *a* two barb-like papillæ; *b*, mouth. *c*, œsophagus *d*, intestine.

Fig. 4. Eggs, highly magnified: *a*, eggs before they have left the ovaries, *b*, eggs showing nuclei; *c*, eggs after they have passed through the oviduct: *d*, egg with one cell; *e*, with two; *f*, with four; *g*, with eight; *h*, with many; *i*, egg as it is laid.

Fig. 5. Skin, showing nine of the eighteen longitudinal lines.

Fig. 6. Portion of female: *a*, the intestine; *b*, *b*, the ends of the ovaries.

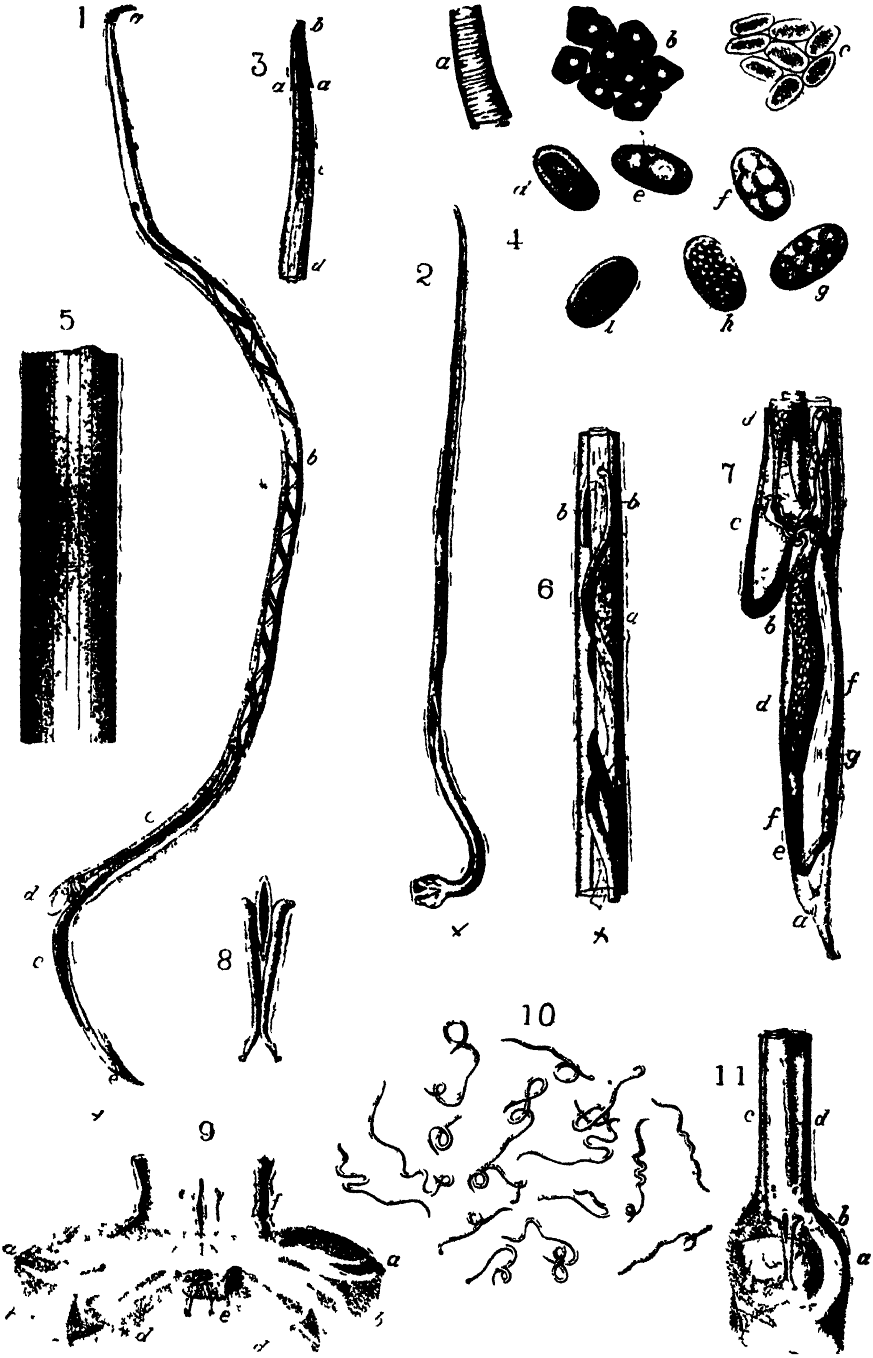
Fig. 7. Caudal end of female. *a*, the anus; *b*, the vulva *c*, vagina: *d*, *d*, uteri filled with eggs: *e*, oviduct; *f*, *f*, ovary; *g*, intestine

Fig. 8 Spicula, enlarged.

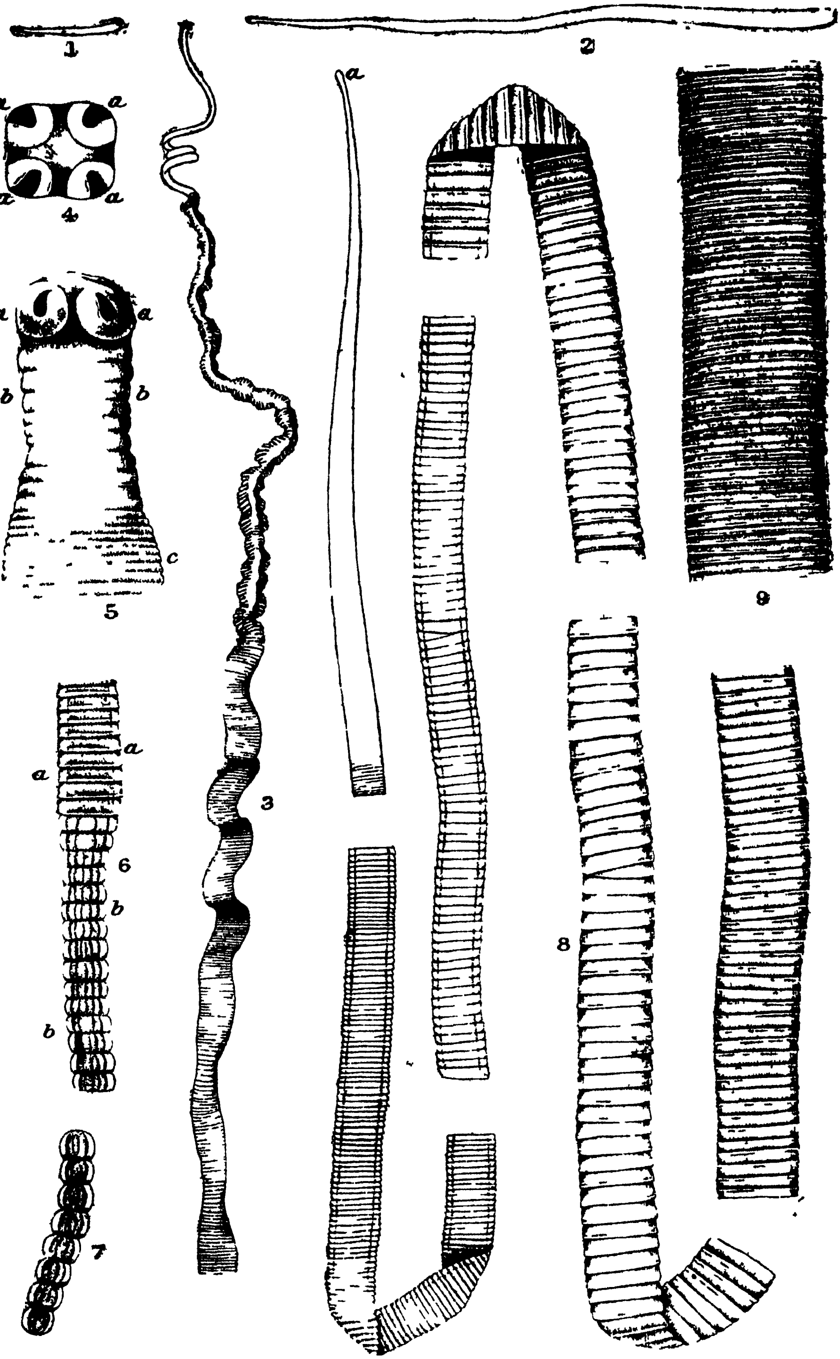
Fig. 9. Bursa, expanded to show costæ: *a*, ventral; *b*, ventro-lateral; *c*, lateral; *d*, dorso-lateral; *e*, dorsal; *f*, spicula

Fig, 10. Group of adult males and females, natural size.

Fig. 11. Caudal end of male: *a*, bursa; *b*, spicula; *c*, seminal reservoir; *d*, intestine.



Strongylus Contortus (The Twisted Stomach Worm.)
(From *The Animal Parasites of Sheep*, by Cooper Curtice, D V S , M D)



Taenia Expansa (The Broad Tape-Worm)

(From *The Animal Parasites of Sheep*, by Cooper Curtice, D V S , M D)

But, notwithstanding this apparent success, reports continued to come in of losses having occurred after dosing sheep with bluestone solution. Subsequent to this, I superintended the dosing of a flock of ewes and lambs, about 1,800, twice within six days, with bluestone solution. The strength of the solution used for the first dose was one pound of bluestone to 24 Imperial quarts of water, and the doses given were for sheep over 18 months, 4 ounces; 12 to 18 months, 2 ounces, and lambs ranging from three to six months, 1 to 1½ ounces. Not one sheep or lamb died, or suffered from an over-dose on that occasion. The reason why this flock was dosed a second time was (a) because both ewes and lambs were very badly infested with these worms, the lambs in addition being full of tape worms, and (b), because the lambs were not removed from the flock and fasted previous to the first dosing, and an examination showed that the dose was not effective in consequence.

The strength of the mixture used for the second dose was 23 Imperial quarts to the pound of bluestone, which gives 8½ grains to the ounce. The same quantity of the mixture was given to the sheep, as on the first occasion, but the dose for the lambs was increased to 1¼ and 1¾ ounces according to age. The majority of the lambs were poor and weak, and three or four died purely from the effects of being dosed; but three died from inflammation of the stomach, from the direct effects of the dose, and about thirty appeared to be sore and seedy looking for twenty four hours. Three ewes also died from inflammation of the stomach, and a few were seedy looking twelve hours after. This experiment clearly showed me that the strength of the solution should not be higher than 24 quarts to the pound of bluestone. It is necessary to mention that no care was taken of this flock, to keep them away from water the day that they were dosed; although I recommended that this should be done.

But, notwithstanding these apparent results, I met with a painful experience myself later on. During the month of March 1892 I actively superintended, the dosing of about 10,500 sheep in the Wodehouse district. The first flocks dosed numbered about 3,400.

TÆNIA EXPANSA, Rud

Figs. 1 and 2. Young tape-worms, natural size.
Fig. 3. Head end of tape-worm drawn to show vermicular contractions when living.
Fig. 4. Head, top view · *a*, *a*, the suckers or cups, by which the worm attaches itself to the intestinal walls.
Fig. 5. Head, side view: *a*, *a*, suckers; *b*, *b*, folds in the neck, *c*, *c*, the first segments.
Fig. 6. The large end of a young tape-worm: *a*, *a*, segments which are not mature enough to drop off. *b*, *b*, segments ready to pass away from the worm.
Fig. 7. Segments, or proglottides found, separate from the worm.
Fig. 8. An adult tape-worm, drawn in sections at regular intervals apart *a*, head.
Fig. 9. A fragment of another worm, which is not only slightly larger, but whose segments are shorter and broader.

The specimen shown in fig. 8 could have assumed very much the same form when alive, as is seen in fig. 9.

The bluestone was a very good, commercially pure sample and uniform in quality. The solution consisted of one pound of bluestone to 24 quarts, or 6 gallons of water. The doses were for lambs six months old 1½ ounces; 12 to 18 months 2½ to 3 ounces; over 18 months 4 ounces. Two flocks, about two thirds of these sheep were dosed after a fast of from 26 to 30 hours. Out of these two flocks seven sheep died of inflammation of the stomach, as a result of the dosing.

The remaining flock could not be dosed the same day, the weather having prevented us from commencing operations until midday; consequently they had to be kept until the following morning, making their fast over 48 hours. Out of this flock the owner informed me that 37 died. In this flock it was very evident that the heavy mortality was mainly due to the long fast, the bluestone solution going direct to the fourth stomach, in an undiluted form.

Before I was made aware of the heavy mortality in this flock, I had already dosed other two flocks, with the same sample of bluestone; using the same strength of solution and the same relative doses.

The first of these flocks numbered about 800, and consisted of hamels of different ages. The flock was fasted 24 hours, and the dosing occupied 3½ hours. Nine died from the effects of dosing in this flock, and the owner informed me that they were all *young* hamels, with two teeth only, and he and I agreed that it was very probable that they had by mistake received the dose intended for a full grown sheep. The second of these two flocks consisted of about 1,200 mixed sheep, they were fasted 24 hours, when we commenced to dose them, and the operation, including an interval for dinner, occupied seven hours. I carefully mixed the solution, and measured out all the doses myself. I was, therefore, much disappointed to learn that nine sheep died from the effects of the dosing.

Subsequent to this, I dosed other two flocks of sheep, consisting of about 1,300 sheep in each flock with the same sample of bluestone, but instead of using 24 Imperial quarts—36 whisky bottlefuls, I used 37 bottlefuls. The sheep were fasted 24 hours before we commenced to dose them, and in this instance we dosed the flocks on separate days, so as not to prolong their fast unduly. Great care was exercised in mixing the solution and measuring the doses, the exact amount being marked on the bottles used, with a file. Out of these two flocks only one sheep became very ill from the effects of the dose. As soon as it was observed, I gave it two teaspoonfuls of laudanum in a little milk and about three hours later repeated the dose in half the quantity. The sheep was all right the following day. Three other sheep died subsequently from dropsy and debility, but not from the effects of the dose. It was, however, satisfactory to find, that the worms were all killed in these cases.

After that experience, I was compelled to admit that with commercially pure bluestone, which should be of a uniform dark blue colour, the strength of the solution, and the size of the doses which I had previously recommended, were not quite safe, especially after a prolonged fast.

That a longer fast than 30 hours, renders sheep more liable to suffer, I had another very good illustration. I superintended the dosing of two other flocks containing respectively 850 and 900 sheep. On account of fearful weather, these two flocks were fasted over 36 hours, before we commenced to dose them. And the same cause led to frequent interruptions, so that the dosing occupied ten hours. I, however, made the bluestone solution weaker, using 42 whisky bottlefuls of water—(7 gallons)—to the pound of bluestone. The flock of ewes and lambs was dosed first, but as the owner wanted to wean his lambs, the ewes were returned to the kraal, after grazing for about two hours. The hamel flock were dosed last, and only finished after they had been in the kraal for 46 hours. They were, therefore, allowed to go to the veld, as soon as the last one was dosed. The results were that ten ewes and three hamels died from the effects of an over-dose. I say over-dose advisedly, because, in addition to the arrangements at this place being very defective, the weather was simply execrable, and very trying to Europeans and Natives. There was a great deal of irregularity, in consequence of these adverse conditions, in the filling of the bottles. I frequently drew attention to the fact, remarking that although an extra dose now and then, did not appear to amount to much; it would look different when the carcases came to be counted. That it was the irregularity of the dosing which was principally to blame for the mortality is borne out by the fact that on the following morning I dosed a flock of about 800 mixed sheep, which had also been fasted 36 hours before we commenced to dose them. In this instance I made the solution exactly 26 Imperial quarts to the pound of bluestone, two bottles less than I made the solution the previous day. I gave the same relative doses, but I attended to the filling of the bottles myself. The result was that not a single sheep died or appeared seriously affected by the dose in this flock. This clearly pointed to the necessity for exercising care in measuring the doses, more especially for sheep of different ages.

But, notwithstanding these apparently satisfactory results, I felt constrained to recommend that the bluestone mixture should not be made with less than 42 whisky bottles,—practically 7 gallons—of water to the pound of bluestone, and this strength of mixture was used for a long time. Nevertheless, although I have never personally experienced any bad results when using the usual doses of a bluestone solution of this strength, and many sheep farmers have been equally successful; still individual reports have been received stating that fatalites similar to those described by Mr. H. M. S. Bastard in the May number of the *Agricultural Journal* have been experienced from its use at the above strength.

This caused me to renew the experimental dosing of sheep and lambs with *pure* sulphate of copper obtained from the chemist. Using lambs and young sheep principally as they are the most susceptible—and usually the greatest sufferers.

There can be little doubt that there is a great difference in the quality of the bluestone sold commercially. For example, I once saw a sample of bluestone used by a farmer for dosing his sheep, which was far from pure. He made the solution of the strength of one pound of bluestone to 30 bottles of water, and gave his young lambs two tablespoonfuls of this mixture, and did not kill one. It was evidently effective, for I examined the lambs subsequently and found that they had much improved. But if this farmer had used commercially pure bluestone of the same strength, he would, in my opinion, have killed a large number of his lambs, whereas if he had dissolved the pound of bluestone in 40 bottles of water as recommended at that time, it would most probably have proved comparatively useless. My recent experiments however, shew that if a sufficient quantity of the mixture reach the fourth stomach undiluted, a much weaker solution of bluestone than that previously used, does kill these worms.

As I mentioned in my reply to Mr. Bastard in the May number of the *Agricultural Journal*, I dosed a small flock of lambs, about five months old, with a mixture made of 1 lb. of bluestone dissolved in 72 bottles of water, and gave each lamb four ounces—which contained 17 grains of bluestone. These lambs were badly affected, and in very poor condition, and I was afraid of killing any of them. They improved, however, and I repeated the dose in 14 days. These lambs did not suffer in the least, but improved rapidly in condition. Indicating that the dosing was beneficial.

Immediately after this I used a solution of bluestone of the strength of 1 lb. of bluestone dissolved in 50 whisky bottles of water—fully 8 gallons. I dosed twenty-four lambs, just under one year old, with this mixture, giving them 3 ounces each, or 18 grains of bluestone. They did not suffer in the least from this dose. After an interval of ten days, Mr. Robertson dosed 22 of these lambs with *four* ounces of a mixture of the same strength, which contained 24 grains of bluestone. Of the remaining two, one received 5 ounces, and the other 6 ounces of the same mixture—30 and 36 grains of bluestone respectively.

All the lambs purged slightly, and strange to relate, although the two that received the larger doses of 5 and 6 ounces respectively, remained all right, one of the 22 which received 4 ounces only, died from the effects of the dose. It was certainly the smallest and puniest looking one of the lot, but in other respects it was healthy. Its death was undoubtedly due to the action of the bluestone mixture on the stomach and small intestines. It is very evident, therefore, that, in those cases in which the stomach happens to be empty, and the bluestone mixture reaches it direct in an undiluted state, that even a strength of solution of one pound of commercially pure bluestone dissolved in 50 bottles of water is strong enough, in individual cases, to cause inflammation of the stomach of lambs and young sheep, which may terminate fatally.

The opinion which I have hitherto held is that it is the *strength* of the solution which produces the inflammation of the stomach, and is the direct cause of the death of the animal, and not the *quantity* of the bluestone introduced into the system. But while this is apparently true, it has to be borne in mind that when the *volume* of the dose is considerably increased, a proportionately larger quantity of the solution will reach the fourth stomach direct, and undiluted, than when a smaller dose of stronger solution is administered. This is clearly shewn in the following experiment, which Mr. Robertson superintended. It will be observed that one lamb only suffered from the previous dose of four ounces of the mixture of bluestone—one pound to the fifty bottles of water. But the death of that one clearly shewed that a solution of that strength, if it entered the *empty* stomach of a lamb direct in sufficient quantity and undiluted, was strong enough to produce acute inflammation and cause the death of the lamb. It was, therefore, determined to slightly increase the volume of the dose, but to maintain it at the same strength in order to ascertain its effects on the remaining 23 lambs. After an interval of three weeks, when the lambs were looking well, Mr. Robertson dosed them with 4½ ounces of the bluestone mixture, of the same strength as that used previously. That additional half ounce added only 2 grains of sulphate of copper to the dose. We naturally expected that the effects of this dose would be proportionately more severe than the previous one, which had reached the extreme limit of safety; but we were not prepared for the disastrous results which followed. Two of the lambs died about 24 hours after being dosed, two more the succeeding day, and three more on the third day, and the whole lot purged badly and suffered severely. The weather became very severe, which aggravated the condition of the lambs very much, but there could be no doubt that the principal cause of death was the acute inflammation of the stomach and small intestines caused by the direct action of the bluestone solution. Now the marked difference in the effect of this dose and that of the previous one could not have been due to the additional two grains of sulphate of copper alone, or even mainly, as larger doses of that salt can be given to sheep, along with their food, with impunity. The increased severity of the dose was evidently due to the increased *volume* of the mixture which entered the empty stomach. The lambs were fasted 24 hours before being dosed on each occasion. It will be remarked that both the second and third doses of bluestone administered were very large, considering the age of the lambs. This I readily admit, but the information sought could not be obtained except by pressing the dose to its utmost limit. The experiment, however, clearly shews that a solution of bluestone of the strength of 1 lb. to 50 bottles of water is capable of setting up fatal inflammation of the stomach of a young sheep if a sufficient quantity reaches the stomach direct and undiluted; and the individual fatal cases which so frequently occur when the regulation quantity of the usual strength of solution is administered is evidently due to the abomasum or fourth *stomach* of these particular sheep being entirely empty, and that an unusual proportion of the solution passed on to the stomach direct and undiluted.

If I have interpreted these experiments correctly, they appear to teach (*a*) that a much weaker solution of bluestone than we have hitherto been using is capable of killing these wire worms in the stomach if a sufficient quantity of it reaches that compartment; (*b*) that before being dosed the stomachs of the sheep or goats should be rendered empty by a uniform fast of about 24 hours; and (*c*) that the bluestone purchased should be pure and its solution considerably reduced in strength, but the dose increased in volume. I am, therefore, constrained to recommend that, in using the bluestone solution for the destruction of the stomach wire worms of sheep and goats, the solution should not be made stronger than 60 bottles—nearly 10 gallons—of water to one pound of commercially pure bluestone, and that the doses should be correspondingly increased as follows:—

For Lambs	3 to 6 months	1½ to 2 ounces.
„ „	6 to 9 „	3 „
„ „	9 to 12 „	3½ „
„ „	12 to 18 „	4 to 4½ „
„ „	18 and over	5 ounces.

The experiments clearly indicate that larger doses may be given with safety, but I am anxious not to endanger the use of this remedy which, although it has recently been getting into bad repute, is the only mixture that I have seen tried which is effective in killing these stomach wire-worms at a *single* dose, if the stomach is empty, and the solution enters it in sufficient volume. Further, there is no mixture which sheep and goats will drink so readily as the bluestone solution.

In this connection it is of importance to mention that Mr. G. A. Fincham of Hopewell, Queenstown, sent a communication to the *Agricultural Journal*, December 13th, 1894, in which he states that an addition of mustard to the bluestone solution renders the mixture much more effective. His directions are:—"Take one pound of bluestone pure, ground fine, and mix over night in two bottles of boiling water, placed in an earthenware jar. Next morning add to the above 38 bottles of water. To this mixture add one pound of Colman's mustard, mixed in about two bottles of water, add this to the bluestone solution, stir thoroughly, and give two fluid ounces to each sheep." In the *Agricultural Journal*, Vol XI., No. 2, July, 1897, in reply to an inquiry on the same subject, he says:—"I do not know that I can add anything more about the cure for wire-worm. I regard it as a specific, and for me the wire-worm has to a great extent lost its terrors. . . . . I am quite prepared to say that if properly administered the dose is a perfect cure." And adds: "Should I ever have occasion to dose a badly infected flock again I would double the quantity of mustard, as I am quite convinced that that ingredient has as much or more to do with destroying wire-worm as the bluestone."

Directions for Dosing.

Fast the flock for 24 hours—when large flocks are being dosed, if a 24 hours fast has expired before commencing to dose, it will often be nearly 30 hours before the last of the flock is finished.

This may be avoided by dividing the flocks, so that their fast can be regulated. The flocks should be kept away from water during the day that they are dosed. In dosing goats they should not be placed on their haunches, but allowed to stand as quietly as possible. The assistant places the goat between his legs, takes hold of its horns, and raises up its head until the nose is on a level with the top of the head; the person giving the dose places his left hand over the goat's nose, and inserts one or two fingers into the left side of its mouth to open it, at the same time with his right hand he inserts the neck of the bottle gently into the right side of the goat's mouth, on to the tongue, and pours the medicine steadily down, just as fast as the animal drinks it. Do not attempt to pour medicine down while the goat is bleating, as it is liable to do at times, when roughly handled; under such circumstances the medicine will certainly enter the larynx and descend into the lungs, causing acute inflammation of these organs, generally terminating fatally. In like manner, if the goat coughs while the medicine is being given, the head must be dropped at once, to prevent it from choking. In dosing sheep the same directions should be followed, only the sheep may with advantage be set on their haunches, as, being without horns, their heads can be steadied better by the assistant in that position than when standing. No attempt should be made to force the sheep's mouth wide open and hold it straight up in the air, as I have so often seen done on many farms. The sheep's mouth should be opened only sufficiently to admit the neck of the bottle, which should be placed well on to the tongue, and the sheep allowed to drink naturally. When the sheep's mouth is forced wide open, and held straight up, while the medicine is roughly thrown on to the back of the throat, the animal is almost certain to cough, and a great many may be choked; and although comparatively few may die at the time, a large number will suffer from inflammation of the lungs to a greater or less extent afterwards, and as a consequence they will not thrive, and the bluestone will get the blame for ruining the constitution of the sheep. I have seen a flock which had been dosed in the rough and hurried manner above described, stand coughing in a most distressing manner for hours, and many of them for days afterwards. Whereas, if proper care and patience is exercised, very few should be heard to cough at all after being dosed, and few accidents of any kind should occur.

THE STOMACH WIRE WORM OF OSTRICHES (*Strongylus Douglassii*) AND ITS TREATMENT.

During 1898, Veterinary Surgeon Armstrong conducted a series of experiments, with a large number of drugs, both singly and in various combinations for the destruction and expulsion of internal parasites, more particularly of the *Strongylus Douglassii*, or wire worm found embedded in the surface of the mucous membrane of the stomach. Reports of these experiments were published in

Agricultural Journals Vol. xiii. No. 6, and Vol. xiv, Nos. 4 and 11. The results obtained by these experiments completely confirm the results obtained by myself in a series of experiments which I conducted first in 1883, and repeated in subsequent years, and clearly demonstrate that, amongst the drugs hitherto tried, carbolic acid is by far the most effectual in killing the stomach wire worms, when it is carefully administered on an empty stomach.

Mr. Armstrong, in summing up the results of his experiments, says: In any of the mixtures tried, which included various combinations of carbon-bisulphide, saturated solutions of sulphate of iron, sulphate of copper, common salt, saltpetre, santonine dissolved in chloroform, a concentrated decoction of tobacco, a concentrated decoction of lime and sulphur, paraffine oil, turpentine, liquor arsenicalis, pure sulphurous acid, creolin, etc., it was found that in any of the mixtures which contained carbolic acid the effects were excellent, the worms dying in from a few seconds to a minute, dependent on the strength of the solution. As, however, the effect of the carbolic acid solution appears to be equally as good when given alone, as when in combination with other medicines, it seems unnecessary to add any other drug, with the exception of turpentine, which acts as a stimulant to the kidneys, and an anthelmintic to tapeworms, which are frequently present; in addition to the wire worms. But, notwithstanding the favourable results obtained by direct experiment on badly infested birds, considerable doubt has frequently been expressed regarding the efficacy of the remedy.

There can be, however, no doubt regarding the fatal effects of a five per cent. watery solution of carbolic acid on these worms, if it comes into contact with them. This fact is capable of easy demonstration, either by inserting a portion of the stomach of an ostrich infested with these worms in a five per cent. solution of carbolic acid and water, or by giving an infected bird, after a sufficient fast, a full dose of a solution of the same strength, and killing the bird forty-eight hours after its administration.

I readily admit, however, that there is considerable difficulty in bringing the acid solution into immediate contact with these worms in the stomach of the ostrich sufficiently long to kill them. This difficulty is caused by the situation which these worms occupy in the stomach. Any one who has opened the carcase of an ostrich with ordinary care must have observed that the œsophagus or gullet as it enters the chest or thorax passes along between the lungs, immediately underneath the spine, in that position it enters or rather naturally expands out into the stomach. The stomach extends along in the same direction in close contact with the spine for about its first half, when it curves downwards and forwards, terminating at the entrance of the gizzard, which is situated almost immediately underneath the digestive stomach described. The gastric glands of the stomach are situated along its upper curve, in the most favourable position for permitting the gastric juices to mix freely with the food, as they have simply to drop from the roof of the stomach into the mass of food. It is unfortunate, however, from a therapeutic point of view, that these *strongyli* occupy the same position. These parasites invariably make their first appearance around the borders of the gastric glands, spreading thence all over the inner coat of the stomach, but they exist in greatest numbers on the surface of the gastric gland which extends along the roof of the stomach, where even fluid medicines can with difficulty reach them, and solid medicines, unless in quantity, would scarcely touch them.

But their position in the roof of the stomach is not the only obstacle to their effective destruction. The difficulty of bringing medicines into immediate contact with these is greatly increased by their situation in the inner coat of the stomach. They lie embedded in the surface of the mucous coat immediately underneath the epithelium. The epithelium is that soft, insensitive looking lining which presents itself to the eye when the stomach is opened. It acts as a covering and protection to the vascular mucous membrane underneath. In a healthy condition of the stomach, a short time after death, it peels off, and leaves the mucous coat a clean, pale-looking membrane, except at the part where the gastric glands open, which always presents a pale pinkish hue. In health this epithelial covering is comparatively thin, with a filmy texture, but when the membrane underneath is infested with these worms, they produce in it a great amount of irritation, as they are real blood-suckers; acute inflammation follows, with its natural accompaniment, an exudation of a gelatinous-looking lymphy product which completely covers both the mucous membrane and the worms, to a depth varying from a quarter to half an inch in thickness. It is this gelatinous appearance which led the Dutch farmers to call this diseased condition "verrot maag," or rotten stomach when they first observed it.

It is this thick gelatinous covering, therefore, which prevents the carbolic acid from getting into immediate contact with these worms. We have succeeded, however, in practically overcoming this difficulty, by the administration of a large dose of paraffine oil previous to giving the dose of carbolic acid.

The information respecting this action of the paraffine oil was first obtained at Mr. Charles Southey's farm Culmstock, in the month of January, 1886. Previous to my arrival at Mr. Southey's farm, he had been dosing a number of his ostriches with a mixture of paraffine oil and milk, and in his letter inviting me to come to his farm he stated that "Mr. Hilton Barber believes that a pint of paraffine oil mixed in a pint of milk, and given to the birds, kills these worms," and he added, "I believe that I have cured some birds with paraffine oil also." After my arrival, therefore, the first experiment which we made was to ascertain what the real effect of paraffine oil was. Mr. Southey selected a bird which had received half a bottle each of paraffine oil and milk on the 25th December, ten days previously. We gave this bird twelve ounces each of paraffine oil and milk, and allowed it to return to the veld, as Mr. Southey had done previously. Twenty-four hours after, this bird was killed and examined. On opening the stomach, I was immediately struck by its appearance. The worms were alive and in great numbers, but the whole of the thickened gelatinous layer of epithelium, which is invariably present in such cases, was completely removed, leaving the mucous membrane quite bare and raw looking. There could be little doubt, therefore, that the beneficial effects of the paraffine consisted mainly in removing this thickened gelatinous covering from the surface of the mucous membrane and the gastric glands, and thereby temporarily restoring the digestive function of the stomach. This, and subsequent experiments, showed that the paraffine produced no fatal effects on the worms, for they may be steeped in it for twenty-four hours, and come out as lively as they went in.

Our next experiment was to ascertain whether the paraffine would have the same effect when mixed with the carbolic acid. The first experiment with the mixture was a complete failure, but we repeated it, as it would have been a great saving of time and trouble if one dose were effective, instead of having to give two. The second experiment, however, failed as completely as the first one. It was very evident that the carbolic acid neutralized the action of the paraffine and *vice versa.* We discovered, however, that when the stomach is completely empty of food at the time of giving the carbolic solution, and the bird is kept without food for some hours after, the medicine remains very much longer in the stomach than if the birds are allowed to feed immediately after the medicine is administered. Further, when there is no food in the stomach, its walls contract on its fluid contents, and thus bring the medicine into immediate contact with the whole of its inner surface.

When the stomach is full of food at the time of administering the medicine, or the bird is allowed to feed immediately afterwards, the carbolic solution does not float on the top of the food, but is mixed with it, and soon passes onwards from the stomach to the intestines, even when the digestion of the bird is not very active. If, on the other hand, the stomach is empty when the bird is dosed, and no food is eaten for twenty-four hours after, a period which was allowed to elapse in two cases, the greater portion of the medicine will still be found in the stomach at the end of that time. We arrived at the conclusion, therefore, that fasting both before and after giving the carbolic acid solution, was necessary to obtain its full action on these worms. A long fast after giving the paraffine may not be so essential as it is before administering the dose, as you can with comparative safety give a large dose of that fluid to an ostrich. And being much lighter than the watery fluids of the stomach, it tends to rise to the top. This is one advantage of mixing the paraffine with milk, as it doubles the volume of the mixture without weakening the paraffine, as they do not combine or mix together, and the paraffine immediately rises to the top.

Finding that the mixture of paraffine oil and carbolic acid failed in the double object aimed at,—we tried them separately. Our first experiment was only partially successful, as we administered the carbolic acid twelve hours after the paraffine oil, which proved to be too short an interval.

The paraffine had not cleared off the whole of the gelatinous layer from the surface of the mucous membrane, and in consequence the carbolic acid had failed to kill the whole of the worms. It was satisfactory to find, however, that wherever the worms were exposed, the carbolic acid had acted upon them effectively. Our subsequent experiments taught us that the paraffine oil must be completely cleared out of the stomach, before the carbolic acid is administered, and that this was effected most readily by allowing the birds out to feed—at least 24 hours after administering the paraffine.

Veterinary Surgeon Armstrong received instructions to repeat the experiments with the drugs formerly used, and some others which had been suggested during the interval. Principal amongst the latter was the Bisulphide of Carbon, which Veterinary Surgeon Henning reported favourably upon about four years ago. But it will be apparent to any one who reads Mr. Armstrong's reports, that its destructive action on these worms is not to be compared with that of carbolic acid.

In carrying out his experiments with bisulphide of carbon, carbolic acid and turpentine, singly, and in various combinations, Mr. Armstrong, at my request, used these drugs in their pure and undiluted state—as they are soluble in one another—enclosed in a gelatine capsule, or a piece of the cleaned and dried intestine of an ox, and although the results obtained were apparently very satisfactory, Mr. Armstrong reports that the volume of the dose is too small, especially when using the carbolic acid alone, to enable it to come freely into contact with the whole of the inner surface of the stomach, more especially when it is enclosed in a capsule, it tends then to become lodged at the lower portion of the stomach. In this opinion I fully concur, and think that in following this method of administering the medicines the farmer may have some ground for complaint at the unsatisfactory results obtained. There is no reason, however, when giving carbolic acid alone, to give it in an undiluted state, as a five per cent. watery solution is quite strong enough to kill these worms in a very short time, if it gets into immediate contact with them, and this is a condition equally essential to the success of any other medicine which may be used besides carbolic acid. But as already remarked, the experiments clearly shew that no other medicine yet tried comes anywhere near to carbolic acid in its fatal effects on these worms.

Several mixtures were tried at the instance of the farmers, and administered in the form of pills, with the result that they became lodged in the lower end of the stomach, were gradually dissolved in that situation, and set up violent inflammation of that part of the stomach where the full force of their irritating properties were concentrated. I am of opinion, therefore, that from the peculiar anatomical arrangement of the ostrich's stomach already referred to, all medicines intended to act either upon the wire-worms in the stomach, or on the tapeworms in the intestines should be administered in a fluid condition.

The following are the directions which Mr. Armstrong gave for the dosing of Ostriches for worms, in which I concur:—

Fast the birds for about eighteen hours, and then give the following doses:—

3	months old birds,	2	ounces of paraffine and	2	ounces of milk.
6	,, ,, ,,	4	,, ,, ,,	4	,, ,, ,,
9	,, ,, ,,	6	,, ,, ,,	6	,, ,, ,,
12	,, ,, ,,	8	,,	8	,, ,, ,,
18	,, ,, ,,	10	,,	10	,, ,, ,,
24	,, ,, ,,	12		12	,, ,, ,,

Keep the birds in the kraal for three hours after giving the above dose, then allow them to feed for two or three days; after which, fast them again for eighteen hours, and then give the following dose:—

	Carbolic Acid.	Spirits of Turpentine.	Warm Water.
3 months old birds,	1 drachm.	3 drachms.	2½ ounces.
6 ,, ,, ,,	2 ,,	6 ,,	5 ,,
9	2½ ,,	7½ ,,	6¼ ,,
12	3 ,,	9 ,,	7½ ,,
18	3½ ,,	10½ ,,	9 ,,
24	4 ,,	12 ,,	10 ,,

Keep the birds in the kraal for at least four hours after giving this dose, and at the end of that time it would be a great advantage if, instead of letting them out to graze on the veld, a light feed of grain were given to them; this would be nourishing, while it would distend the stomach but very little, and allow the medicine to continue its action for three hours more, after which the birds might get a good feed, or be turned on to the veld.

It will be observed that turpentine is recommended to be added to the carbolic acid—this is because in the majority of cases the birds are infested with both wire-worms and tape-worms. If there are instances in which there are no tape-worms present, the turpentine need not be added as it has no marked effect on the wire-worms.

On the other hand, if birds are affected with tape-worms only, I would recommend a trial of *Kamala*.

The doses of Kamala are:—

Ostrich chicks 1 month old, 1 drachm; 2 months, 1½ drachms; 3 months, 2 drachms; increasing the dose a little less than ½ drachm for each month. Birds 18 months take 8 drachms, and full grown birds 10 drachms. It costs about three shillings per lb. It may be given mixed in a little milk or water, or it may be made into pills with a little flour and water. In mixing it with water add only a little water first to make it into a fluid paste, then gradually add the required quantity and keep stirring, as it is somewhat difficult to mix properly with water. In making it into pills, a very simple plan is first to weigh the quantity of Kamala which you require for the number of birds to be dosed. Say that the number is 32 eighteen-months-old birds, you would weigh out 32 ounces of Kamala and place it in a large basin, you then add sufficient flour to give it a little consistency, as it is too brittle to make it into pills alone. After thoroughly mixing the flour and Kamala, add sufficient water to make the mass into a stiff dough. A little soft soap added will increase its adhesiveness very much, and facilitate the making of the pills. When you have brought the mass to a proper consistency you divide it into two equal halves; by placing one half on each scale of your weighing machine, you will then have 16 doses in each. You divide these again in the same manner, and you have 8 doses in each, and so on until you have only two doses in each piece, these you can trust your eye to divide equally. By this simple plan, you divide your doses of Kamala equally, and it does not matter how much or how little flour or other ingredients you may have added. There are several other vermifuges for tape-worms, such as the liquid extract of male fern, which may be given in doses ranging from a teaspoonful for an ostrich chick three to four months old, to a tablespoonful for a bird eighteen months and over.

A decoction of pomegranate root bark also acts very effectually on tape-worms in ostriches.

Arsenic, in the form of Cooper's powder, is sometimes given to ostriches for tape-worms, as well as to sheep and goats, and it is said to act very effectively. I have not had sufficient experience with it in ostriches to advise respecting the exact dose for birds of different ages; chicks three months old take about as much as a large lamb.

FEEDING SICK OSTRICHES.

In feeding ostriches which are very much reduced in condition from the presence of these parasites, it is much better to give them small quantities of nourishing food than to allow them, in a fit of generosity, to gorge themselves with a large amount of bulky food. I have seen numbers of birds killed by getting an extra allowance of grain, along with some bulky food such as prickly pear leaves or American aloe (*Agave*) leaves, immediately after being dosed for wire-worms. Under such conditions their stomachs are so weakened by the inflammation caused by the worms, that they are unable to contract upon a large mass of food, or to digest it properly. Indigestion and constipation, and frequently dropsy are the usual accompaniments of the presence of large numbers of these parasites in the stomach. When, however, there is an abundance of succulent food, this counteracts the tendency to indigestion and constipation, and often enables the birds to overcome the debilitating effect of the worms without the aid of any medicine. Hence the majority of ostrich farmers do not consider it necessary to dose their birds, for the purpose of clearing out these worms, so long as there is plenty of green food, and the birds remain in fairly good condition.

Whereas that is the very time that every effort should be made to clear the birds of these weakening parasites, which can be accomplished more easily and more effectively under such favourable conditions, than if it is left until the period of drought, with its natural accompaniment poverty, arrives. If, however, the birds require to be dosed during a time of drought, I would strongly urge the farmer who has no succulent food to offer his birds, to procure for them a liberal allowance of bran, it will in great part act as a substitute for grain food, which requires to be given to the birds under such conditions. A little sulphur and common salt could be added, which would assist materially to keep the bowels regular, and aid digestion, which is of great importance.

There is another matter in connection with the dosing of ostriches for worms, which is deserving of more consideration than it generally receives, viz., the great advantage of obtaining a change of veld. Unless ostrich farmers can make some arrangement for giving their birds a run on clean veld immediately after being dosed tor worms, to prevent immediate reinfection, no satisfactory results can be expected from the administration of the most effective remedies, more especially when only one dose is given, which is the general rule.

Any one who has examined the condition of the stomach and bowels of ostriches which have died from the effects of these worms must have been impressed with the fact that the number of worms was incalculable, and the altered condition of the organs which they infest so great, that it would be impossible, by one single dose of medicine, however effective, to expel the worms, and restore the organs to their normal healthy condition. And not only should all infested birds receive two courses of medicine, as above directed, in close succession, but unless the farmer can arrange to give his birds a change to clean veld immediately after the dosing is finished, he should arrange to dose all his young birds systematically at stated intervals, and not wait until the food is scarce, the condition of the birds greatly reduced, and their constitutions weakened.

THE FARMERS' ASSOCIATIONS OF CAPE COLONY.

By Dr. Eric A. Nobbs.

Having dealt last month with the Agricultural Societies of the Colony, it is proposed now to discuss the Farmer's Associations. At the outset it must be explained that the following information has been compiled from many sources so that it is highly probable that inaccuracies occur and that the data are incomplete in certain parts. It is therefore requested that the attention of the writer may be called to all such discrepancies in order that they may be corrected. and that in future a reliable and up-to-date record may be kept of the state and progress of these associations whose active success is of such vital moment to the agricultural prosperity of the Colony.

Primarily, Farmers' Associations exist for the purpose of bringing farmers into touch with each other, and these bodies, therefore represent, and their activity is a measure of, what the farmers have done for their mutual advancement without the interference or support of Government. Farmers' Associations have been formed in order to secure united action in the promotion of the interests of the farmers, to protect the same, to serve as a medium in bringing to the notice of the Government the needs or grievances of farmers, and to offer to the Department of Agriculture assistance and information. Certain associations formerly meddled with political questions, but at the present time all party politics are barred, in consequence of which the scope and power for practical good of these bodies has materially increased.

One or two associations particularise amongst their objects the promotion of agricultural shows, whilst others take an active part in these events, thus in parts bridging over that arbitrary differentiation which has been drawn between them and agricultural societies. Elsewhere show-grounds are utilised for stock fairs held under the auspices of the associations, while shows are occasionally held on land, the property of an association. No hard and fast line between these organisations can therefore be drawn, and it is to be regretted that a tendency should exist in certain quarters to accentuate the distinctions of two bodies really working along parallel and harmonious lines and with identical interests to serve.

The method of procedure of Farmers' Associations is simple in the extreme. The main feature common to all associations is the periodical meeting of members for the purpose of discussion. These meetings are held monthly, quarterly. or in some cases only half-yearly, according to circumstances. Generally a paper is read or a lecture given on some subject of general interest, and is followed by open discussion. Thereafter matters of local interest are considered.

A few associations more enterprising than the rest have established libraries of books on farming matters, and subscribe to the leading agricultural periodicals of Europe, and America and circulate these amongst their members. Others again promote the holding of agricultural shows usually by encouraging the formation for that express purpose, of an ephemeral "Agricultural Society."

The Paarl Farmers' Association is conspicuous for having inaugurated two novel features both deserving particular attention from its sister associations. For several seasons, under its auspices, a competition is held and the "Jagger" Silver Cup (Value of 50 guineas) is offered for the best kept orchard, open to any farmer in the Paarl Division, and to be kept if won three times in succession. Judges visit the competing orchards during March and December. The other innovation dates only from the first of September of this year. Mr. Kohler, M.L.A., has offered to lend the association free for a few years a number of high-class Jersey Bulls. His object is to help his fellow farmers to improve their milch cows with the idea of increasing the quantity and quality of the butter made in the district. Some nine bulls have been so distributed, the holders charging a covering fee of half-a-crown to their neighbours. The experiment will be watched with the keenest interest for it opens up great possibilities for the future. These two examples are deserving of special attention by other associations.

Certain associations have for many years successfully conducted the local stock fairs On a convenient piece of land, an office shed and refreshment room have been erected, together with ranges of pens for the stock. These pens are best constructed of strong wooden fencing posts and 1¼inch gas-pipe rails, convenient sizes being 18 feet by 16 feet for 100 head of small stock, half that size for single truck-loads (42), with a few larger ones for flocks of 500 or more. For cattle, 18 feet by 12 feet is sufficient for four or five head, or 18 feet by 15 feet for lots of from six to eight head. A roof over the pens is not essential, but is none the less a great improvement. Different conditions of sale are arranged to suit the varying needs of particular districts, but the following seem to be generally applicable :—

> "The auctioneers to be appointed under the following conditions :—(a) that they charge on all sales not more than 5 per cent, of which 1 per cent. must be paid to the Association for advertising, &c. (b) that they undertake to pay sellers cash immediately after sale. (c) that they allow buyers three months' credit on approved bills when required, where the amount is £10 or more."

Elsewhere the transactions are strictly cash throughout. At least one association after having paid off all costs of buildings, &c., has allowed its secretary ½ per cent. of its share, as the duties of conducting such a sale are arduous.

Out of the commission received by the association, a fund is raised to offer prizes on special occasions, such as the Christmas fairs.

At Bedford, the refreshment difficulty has been overcome by the ladies offering their services and dispensing tea, coffee, fruit and cakes, the proceeds going to charitable objects. At that centre the usual sales mount up to about £2,500, while a record of £10,000 has been obtained during the times of high prices.

In some associations stress seems to be laid on the work of a Vigilance Committee to which considerable powers are entrusted, but such an arrangement cannot but diminish the interest of other members in the affairs of the association, the brunt of the work falling on the few who form this special committee. Elsewhere a standing committee of correspondence is appointed to keep in touch with kindred societies to collect or give information. A useful practice of certain associations is that all meetings are open to the public, but no non-member may address any meeting without the consent of such meeting, and of course non-members have no voting powers.

Some associations have found it necessary to limit the duration of speeches to five minutes, but the usual difficulty in actual practice, appears to be to induce members to give vent to their opinions, many being inclined to follow the proceedings with interest but in silence, while only too often members show their confidence in their fellows by absenting themselves altogether.

One cautious association renders the proposer and seconder of a new member jointly liable for his subscription for the first year.

Without exception an aim kept constantly in view is the elimination of any racial distinction and the harmonious working of the associations in general is a striking proof of their success and beneficial influence.

As showing the far-reaching range of subjects, a list of those recently under discussion is here given :—

Livestock naturally holds a leading place in the discussions, and all manner of questions on breeding, feeding and tending domestic animals in health and disease, quarantine, importation, regulations, Scab Act, ticks and "tick diseases," hence dips and dipping tanks and Government loans towards the construction of tanks and so on, come up for discussion. Brands, stock thefts, hence local questions of police protection, jackals, vermin-proof fencing, fencing generally and gates, even questions relating to shell-fish and trout acclimatisation are dealt with. Farming operations with cereals, lucerne, viticulture, fruit growing, tobacco, dairying are all discussed and the diseases and pests of crops and fruits, be it rust, phylloxera, codlin moth or the rest. The maintenance of roads is a favourite theme and stock thefts by road parties a common complaint. Over-stocking, treading out and general deterioration of the veld, the formation of sluits and measures for their prevention seem to be receiving ever more and more attention. The water question provokes discussion from many points of view, conservation, utilisation, water-rights, the Irrigation Bill, construction of dams, canals, weirs and pumping plants, the reduction of railway rates for material for irrigation, duty-free oil for pumping plants also boring for water, its cost, the use and abuse of Government drills and reduction of their cost.

Of late co-operation in its many phases has come up for debate, and no doubt will continue to be a fruitful subject for discussion. Its aims, methods, effects and desirability, the application of the principle to our farming industries particularly to wine-making and dairying, and in the marketing and distribution of produce, in combined buying, for mutual insurance, are all being considered. Allied subjects are the methods of marketing produce, particularly fruit, cold storage, the use of refrigerating cars and rapid transport of perishables, the "returned empty" problem, the best means of reaching markets, colonial and foreign, hence railway rates and facilities and the shipping ring, also railway, pos'al and telegraphic facilities are discussed. One association even specifically mentions amongst its objects "the comfort of the travelling public," and resolutions regarding railway carriages and coffee cups are on record.

Agricultural education, both the teaching of agricultural subjects in ordinary schools and the establishment of agricultural and industrial schools as well as general education in rural districts are favourite topics, whilst closely allied to these is the question of experimental research, and the proposal to establish at certain suitable centres, experiment stations under Government control such as are to be found in other countries.

It is largely through the instrumentality of the local farmers' associations that the sites of experiment stations now being established, have been selected, and no doubt in the future due consideration will always be given to such recommendations.

Questions of taxation, free trade versus protection, meat duties, excise, even dog-taxes and local rates, all received attention, also state aid on the pound-for-pound principle and otherwise. Current legislation affecting farming interests, such as the Irrigation Bill, Insect Pests Bill, Fertillisers Control Bill, Scab legislation and the like all come in for frequent discussion, and valuable suggestions are made, though the spirit of party politics has carefully to be avoided. Noxious weeds receive frequent attention, burr-weed, jointed cactus, steinbok zuring, amaranthus, Mexican poppy, duiveltjes, prickly pear and the rest.

The purity of seed, seed testing by Government, the introduction of new seed, the use of guano and artificial fertilisers, guano depots, and the price of that commodity, also receive frequent consideration.

The labour question in all its forms, treatment of natives, hut taxes, locations, the liquor laws, Kaffir beer, bywoners and poor whites are often discussed.

While the holding of shows is occasionally regarded as outside the scope of Farmers' Associations yet the prize lists are a fruitful subject for debate.

"To see that the Government officials do their duty" is the professed aim of one association, while more generally "Government official" is repeatedly named as a matter of interest to others.

A limited number of associations include also among their objects the holding of an annual dinner.

It will be seen from the foregoing that Farmers' Associations may justly claim to include within their scope all matters of farming interest and to be prepared to express opinions upon them. When anything of importance to a particular district has been threshed out it is usually crystallised in the form of a resolution, adopted and to be acted upon. Unfortunately the matter too often ends here. The desirablity of action by the members in some common cause is affirmed, or pious expressions of opinion are forwarded to others interested, to public bodies, often to Government Departments, and then the matter is allowed to drop, the joint action agreed upon is not taken or the facilities asked for are, when granted, not taken advantage of. Occasionally a resolution is circulated amongst kindred bodies for a joint expression of opinion and carried through to a successful termination, but too often it is to be feared it all ends in talk. It is of course more easy to carry a resolution than to put it into practice, but it is to be regretted that so many projects seemingly useful and practicable fail to materialise and that so many good resolutions are allowed to lapse.

The resolutions framed at the meetings of Farmers' Associations are of peculiar value in that the matters dealt with are the vital interests of the speakers, that free discussion take place and that the ideas of those most competent to speak and most immediately concerned are given full vent. The decisions arrived at are coming to be more and more regarded as the voiced expressions of local opinion, and as such to be given effect to. On account of this growing influence of the associations, it is to be regretted that, as yet, only the minority of farmers in any district, though these include the more enterprising, join the Farmers' Associations. Since the decisions of the associations already carry some weight and would be much more influential if only more truly representative, it is particularly desirable that all sections of the community should join together and take part in the discussions. The matter rests with the farmers themselves, since the associations extend a hearty welcome to all.

The weight of the decisions of a Farmers' Association is greatly enhanced when it receives the support and approval of other associations, particularly so when they are adopted at conferences of delegates from all parts. It is therefore highly desirable that the associations should all be affiliated for mutual support and to give a national as well as a local value to their findings. At the present time the greater number of Farmers' Associations (41 out of 59) are united together in a "Central Association" which meets once a year in February at some convenient centre as a "Farmers' Congress." The value and importance of this organisation is hardly to be over-estimated, representing as it does the opinion of so many of the most advanced farmers of the day. A separate body of similar character is the Griqualand East Farmers' Congress serving the extreme north-eastern portions of the Colony. Recently there has been a rumour of some five Farmers' Associations forming an independent alliance, but it is to be hoped that this suggestion will not be carried out, since, in so breaking away, they defeat the very object for which they strive, the strength which comes from union. It is highly to the advantage both of individual associations and of the farming public that any such periodic conferences should be as representative as possible, otherwise the interests of particular sections of the community are liable to be overlooked, while the conclusions of the congress fail to possess that representative character which is so essential if they are to be acted on by Government or other responsible bodies. It is therefore to the general interest that the comprehensive character of the Farmers' Congress be sustained and widened, and for this reason all unaffiliated associations may be strongly recommended to unite with the central body, and to send delegates to its deliberations.

In the accompanying table will be found a list of Farmers' Associations, so far as is known, complete and up-to-date. As previously mentioned it is particularly requested that secretaries of associations and others will keep the writer informed of any omissions or alterations.

FARMERS ASSOCIATIONS

(1) AFFILIATED TO THE CENTRAL ASSOCIATION

Name	Membership	Secretary and Address	Date of Meeting
Albert	50	John Forbes, Cragievar, Burghersdorp	2nd Sat in month.
Bathurst District Farmers and Fruit Growers	46	J F Ham P O Martindale	Trappes Valley and Martindale on 3rd Tues & 3rd Thurs. respectively in alternate months
Beaufort West	31	H A Jackson Nelspoort B W	
Bedford ..	70	Thos Hall Bedford	Quarterly
Bolo ..	15	A Elston, Bolo, Stutterheim	2nd Sat Monthly.
Bolotwa .	30	R F. Weir, Bolotwa Glen Grey	
Cathcart	25	L L Kemp Bell Rock Cathcart	Quarterly
Central Albany	82	S Rippon, P O. Highlands	Last Wed , Monthly.
Chalumna	58	F Willows, Shelford Ward 3, East London	Last Sat Monthly
Colesberg .	15	W. L. Gordon Davis, Colesberg	
Cradock . .	81	J Butler, Cradock	Fri preceding 1st Sat in alternate months
East London	32	M Tindale, Amalinda, East London	3rd Sat Montly.
Adelaide & Fort Beaufort	42	~~J. E. Niland, Adelaide~~	Quarterly
Gaikaland	25	H C McLachlan, Hayslope Engwali, via Dohne	Quarterly.
Gamtoos River .	15	John Clarke, The Oaks, Patentie, via Hankey	Last Sat , Jan , April, July, October
Griqualand West (Kimberley)	75	G Whiley, P O. Box 559, Kimberley	
Griqualand West (Modder River)	58	P. J. Lubbe, Kalkdrift, Modder River	

(i) AFFILIATED TO THE CENTRAL ASSOCIATION. *(Continued).*

Name	Membership	Secretary and Address	Date of Meeting
King William's Town	42	Rev C H Hutt, Kei Road	
Komgha . ..	40	~~A V Giarbie, Haddees,~~ Komgha T T Taylor	3rd Sat., March, June, September
Koonap Heights ..	75	C G Wood, Koonap Heights, Fort Beaufort	
Lady Grey	62	W Cooke, Roodekoppies, Lady Grey, Aliwal North	
Langberg. -		J T Smith Langberg, Postmasburg	
Lower Cathcart ..	55	J H Hayter, Toise River, Cathcart	Quarterly.
Macleantown	25	~~H. F. Reynolds, Macleantown~~	R N Hantler, Macleantown
Midland . ..	64	J M C Bowker, Doornberg, Middelburg	
Molteno . .	45	A Francis, Stewart's Post, Molteno	2nd Sat, Monthly
New England ..	52	W C. H Slater, Ballock, P.O Wartrail, Barkly East	Quarterly
Pokwani ..	45	~~A. Hause, Blackpool, Pokwani~~	J Flynn, Schaapfontein, Pokwa
Post Retief ..	38	J D Mills, Post Retief, Fort Beaufort	Quarterly
Queenstown .	60	F P Fincham, Roydon, Queentown	
Somerset East ..	68	A P Myburgh, Somerset East	
Stockenstrom		J Inglethorpe, Seymour, Stockenstrom	
Stutterheim ..	65	M W B. Webb, Wattle Grove, Dohne	
Tarka . .	56	R Newton King, Wheatlands Tarkastad.	3rd Sat, Jan, Mch., May, July, Sept, Nov.
Tylden . .	32	J Drayton, Tylden, Queenstown	
Upper Albany ..	60	W P Slater, P.O Box 85, Grahamstown	
Victoria East ..	60	E H Dewey, Alice, Victoria East	2nd Wed., alternate months.
Vryburg	83	W Edmunds, P O. Box 33, Vryburg	
Whittlesea ..	56	C S Edwards, Queenstown	
Wodehouse ..	40	W. Burgess Kiloh, Dordrecht	Last Sat., Monthly
Xalanga	50	J. G. Laing, Bieza, Bonawe, Cala	2nd Sat., Monthly
Zwaart Ruggens ..	124	C G. Lee, Klipplaat, P O	

(ii.) AFFILIATED TO THE GRIQUALAND EAST FARMERS' CONGRESS.

Mount Currie ..	43	R. Webster, P O. Kokstad	Annual Meeting, 3rd Sat, January.
Pot River		A. W. Sephton, P.O. Maclear	
Umzimkulu ..	25	J. C. Humphrey, Falklands, P.O Sneezewood, East Griq.	
Swartberg ..	31	W. Kershaw Young, Beersheba Post, P.O. Sneezewood	

(iii.) UNAFFILIATED ASSOCIATIONS.

Name.	Membership.	Secretary and Address.	Date of Meetings.
Alexandria	40	J. E. Chowles, Alexandria	
Cape Flats	55	G. Barrett, P.O. Box 964, Cape Town	
George		Dr. St. Leger, George	
Gonubie and Kweleghа	57	F. Roselt, P.O, East London	1st Mon., Monthly.
Hermon	8	J. F. Pentz, Hermon	
Kei Road	41	Kei Road (R Warren)	Monthly.
Knysna		J J. Meteterkamp, Knysna	
Paarl	154	James Gribble, Paarl	1st Wed., Monthly.
Peddie	28	C. A. Wagner, Peddie	3rd Wed , Monthly.
Southwell	45	E. Parker, Craigie Burn, Port Alfred West	
Sunday's River Farmers' and Fruit Growers'	25	R. C. MacDonald, Strathsomers Estate, P.O. Hayville	1st Thurs., Dec , March, June, Sept
Uitenhage		J. Cuyler, Cuyler Manor, Uitenhage	
Umtata	26	R. E. Hardwick, Umtata	1st Tues , Monthly.
Total Membership	2,736		

DEAD OR MORIBUND ASSOCIATIONS.

Ceres Farmers' Association.
Elliot Farmers' Association.
Mossel Bay Farmers' Association.
Newcastle Farmers' Association.
Maclear Farmers' Association.
Butterworth Farmers' Association.
Highland Branch Farmers' Association.
Upper Cathcart Farmers' Association.

The subscription payable by members varies. In a few cases it is as low as half-a-crown, five and ten shillings is the usual, while in one or two associations a sovereign per annum is required.

The associations affiliated to the central body have in all essentials the same general rules, though each is at liberty to form what special rules may be considered desirable. As a result there is much greater uniformity amongst the Farmers' Associations than amongst Agricultural Societies. At the same time the rules of unaffiliated associations are based on similar lines and shew no vital differences. At the Congress held at Somerset East in February, 1905, the constitution and rules were revised and amended, and *inter alia* it was agreed "that no subject of a party-political nature will be discussed at Congress." Copies of the rules both for the Central and for Branch Associations along with any other information may be obtained, by those interested, from the Secretary, Mr Thos. C. Hall, Bedford, C.C.

Of recent years there has been a growing tendency to insert the words "and Fruit Growers'" into the title of Farmers' Associations, and no doubt this would not have been done without good cause, yet it seems somewhat superfluous, since most growers of fruit would be justly indignant if they were told that they were not farmers. Moreover, Farmers' Associations are open "to all interested in their objects," non-farmers being often amongst the most active members, whilst the fruit-growing interests are independently watched over by the Eastern Province and Western Province Horticultural Boards, bodies which receive the same recognition from Government as does the Congress or Union, with financial support in addition.

From what has now been said it will be seen wherein Farmers' Associations and Agricultural Societies resemble and differ from each other. Each does a useful work; they are in no way at variance, seldom cover the same ground, and finally, frequently consist of the same members. Under these circumstances it is not a little surprising that societies and associations should continue to exist side by side where the one organisation could so readily be made to serve both ends, to run the agricultural shows once a year as well as to have monthly meetings for the reading of papers and for discussions. Where each at present does half the work, it would seem simple to have one body to do the whole. Such combination would serve both to economise and concentrate the energies necessary to carry on the propaganda, and so to obtain better results from the same amount of effort, and at the same time would make the organisation, whether called a society or an association, more representative of the locality in which it labours. In this way more effect would be obtained from the money annually voted by Parliament for such purposes, amounting to a sum of £10,000 odd last year. Being also more comprehensive in character, the desires of such bodies would be more likely to receive favourable consideration from the authorities; alleged grievances might receive more attentive hearing, and at the same time it would be more easy to give practical recognition in the form of financial support.

But, perhaps, the chief advantage from combination would be the amalgamation of all the conferences into one really representative and powerful gathering, which could then, when occasion arose, subdivide into special sections to consider the interests of special branches of the agricultural industry, or appoint responsible and representative committees for such purposes.

There is yet one matter which remains to make Farmers' Associations fully effectually and to enable them more completely to serve the farmers of the Colony, and that is: that in every locality where they do exist, every farmer should become a member, and that in districts not yet possessing such advantages, an association should without loss of time be established, in order to voice the grievances and promote the interests of the farming community.

ABORTION IN CATTLE.

By W. Robertson, M.R.C.V.S., Bacteriologist to the Department of Agriculture.

Technically, abortion is the term used for the expulsion of the fœtus and fœtal membranes before the natural period. The normal period of uterogestation or pregnancy in the cow is about nine and a half months, and an abortion usually takes place from the third to the seventh and eighth month; after this month, *i.e.*, when the fœtus is capable of separate existence, it may be termed a premature birth.

Abortion in the cow and mare is either contagious or non-contagious, that is either due to the ordinary causes of abortion, or to a specific micro-organism.

Causes of Simple Abortion.

These are very numerous, and may be divided into internal and external; internal causes such as poor condition, weakness, insufficient food, parasites like fluke and tape worm, acute inflammation of internal organs, and most contagious fevers, lungsickness, rinderpest, and foot and mouth disease. These are all notorious causes of abortion.

Indigestions of all kinds, errors in food and diet, and ergotised grasses (the ergot is familiar as the dark purple or black, hard, spur-like growths which protrude from the seed panicles of certain grasses) are all injurious to the fœtus; the same is true of rust and smut and musty forage harvested under adverse conditions.

The external causes may be, and are, very numerous and varied, such as cold and wet, change of pasture, thunder and lightning, frights, narrow doorways, over-exertion, railroad journeys, and deep gutters behind the stalls. Offensive odours undoubtedly cause abortion (to understand this one must take into account the very acute sense of smell possessed by cattle); carrion in the veld or dead fowls and rats around the cattle sheds, and dead calves—the product of abortions—are often justly chargeable with the maintenance of abortions. Aborting cows often fail to expel the after-birth, and if this remains hanging in a putrid condition, it is most injurious to pregnant cows in the near vicinity.

Amongst other causes of simple abortion must be named the death or various illnesses of the fœtus (which are about as numerous as those of the cow itself), such as the fœtus slipping through a loop in the navel cord so as to tie a knot, and any of the diseases of the enveloping membranes and placenta.

The Treatment of Simple Abortion.

The preventive treatment consists in keeping the pregnant animal away from any of the factors which tend to cause the disease; as if an animal definitely starts to slip the fœtus no power on earth can prevent her. But if a heifer or young mare is noticed to show signs of what may subsequently develop into an attack of abortion, it is advisable to put her in a quiet, dark (not pitch dark) box by herself, give plain non-heating food, chilled water, avoid heating substances such as mealies and wheat, and laxative food such as green barley. Green lucerne and rank herbage, a little dry bran and oat forage is as good as anything, and if green food is wanted, let it be half dry before the animal gets it, and then mix up with the dry forage.

A dose of sedative medicine, such as a couple of ounces of laudanum in half a bottle of water, is often of value.

Do not meddle with the mare's or cow's vagina, and *never use injections of any kind if abortion is threatening.*

A cow or mare will frequently abort several times in succession. This may be due to some constitutional weakness in the organs of reproduction or to the fact that during a previous labour they received some injury. In such a case, if the cow is not particularly valuable, she should be fattened and sold to the butcher, but if the subject is a valuable breeding animal, it is recommended that she be allowed to go barren for a season, and when again in use to employ a fresh bull.

After an animal has slipped the fœtus, care should be taken that it and all the membranes are taken away from the presence of other cows, and the womb washed out with a syringe and Condy's Fluid and water (about the colour of claret will denote a strong enough solution), and the gutter at the rear of the cow flushed with some reliable disinfectant. If much bleeding occurs, syringe out with water just as hot as the hand can bear, *i.e.*, rather *hotter than one could use for hand-washing*; use a considerable quantity—a couple of quarts—and the uterus will be found to contract and the torn blood-vessels close up. Before the injection, it is necessary to see that all the cleansing, as far as possible, is removed.

I should like to say here that the cleansing in cows which have aborted frequently does not come away freely; under such circumstances the hand and arm, well soaped, should be introduced and the membranes removed by gentle pressure, but no force must be used. If this is found impossible, leave the cow alone, and see that the womb is washed out with the Condy's Fluid solution twice daily, and keep apart from other cows, at one end of the shed or stable if no special shed is available, and sprinkle some disinfectant in the drain behind.

If after an attack of abortion the animal seems very weak, a dose of brandy or whisky, ten ounces; laudanum, one ounce; tepid water, a wine bottle, will make a good restorative draught, and many animals, after getting rid of the fœtus, will drink a bucket of thin oatmeal gruel made by *boiling* a little oatmeal in water and diluting largely with tepid water.

CONTAGIOUS OR EPIZOOTIC ABORTION.

Few diseases at the present time cause more worry and annoyance to stock owners, especially the cattle breeder and dairy farmer, than the infectious or contagious form of abortion, as this variety of the disease persists in a herd for an indefinite period of time, can be indefinitely perpetuated and transferred from herd to to herd, and is on the increase amongst the dairy and breeding herds of the Cape Peninsula, especially those which provide the milk supply for Cape Town.

Before the theory that the disease was contagious was definitely proved, these outbreaks of abortion were put down to sympathy, *i.e.*, when one cow aborted, the mere sight or knowledge of the act was sufficient to cause another pregnant cow to abort. Also, to the eating of ergotised grasses and to dietetic errors. All these theories have been refuted. "When an aborting cow is placed in a herd that has hitherto been healthy, and shortly afterwards miscarriage becomes prevalent in that herd, and continues year after year, in spite of the fact that all the other conditions of life in that herd remain the same as before, it is manifest that the result is due to contagium."

As long ago as Scripture history records exist, this affection of stock seems to have been the bane of the breeder. We read that during Jacob's service with Laban for his wife Rachel, Jacob says: "This twenty years have I been with thee, thy ewes and thy she goats have not cast their young." A knowledge of the means how this satisfactory state of things was brought about, would be of great value to the stock man of this century.

Clater, in 1786, and Youatt, in 1834, both regarded it as contagious, and Boulay, in 1863, seems to share the same opinion. Fleming, who compiled the first connected monograph on the subject, says: "Without going further into the question, and without taking into consideration other agencies which may cause extensive abortion, such as ergotised grasses, it may be concluded that this kind of miscarriage is transmissible through the medium of some infection or virulent principle which is really specific in its nature" (Fleming). This simply modified is the "latest and apparently best founded theory of enzootic and epizootic abortion which views the condition as being propagated by a contagium which enters by the genital passages and multiplies between the fœtal membranes and the uterus" (McFadyean).

This view is no longer a theory, but a proved fact, as many workers—Nocard, Kraner, Lehnert—have produced abortion in healthy pregnant cattle by injection into the vagina material from a case of epizootic abortion. Nocard isolated the specific organism, grew it in cultures outside the animal body, and produced abortion by their aid.

Symptoms.—In the early stage, there are frequently no symptoms, and until the slipped calf is seen, the fact of abortion may escape notice. In advanced pregnancy, abortion is the counterpart of natural labour, and the only way that the infectious form can be distinguished from the non-infectious, is in the first case, the continual recurrence of the disease, and the absence of any evident originating cause.

Treatment.—The treatment of simple abortion has been dealt with. In contagious abortion the treatment is purely preventive, and aims at eradicating the causal germ from the shed and cow stalls. As soon as a cow aborts and there is reasonable proof that it is the contagious form, all the cows in the stable, and the stable itself, must be thoroughly disinfected.

Remove the fœtus and membranes and burn or boil them (it is no good burying such things about a farm as they are considered dainties by dogs and pigs and by them promptly dug up and trailed about).

Wash out the womb with the following mixture :—

2 drachms Corrosive Sublimate.
2 ounces Spirits of Wine, or Alcohol, Brandy, will do.
2 ounces Glycerine.

Dissolve in two gallons water, using one and a half gallons at a time and employing a syringe with a long Indian-rubber tube so that the fluid goes direct into the womb. This should be repeated daily and the cow to the left and right of the stall of the aborting animal treated unless in calf in the same way for two or three days.

All the other cows in the herd should have the tail, lips of vulva and buttocks sponged with the lotion daily.

A word of caution must be emphasised :—*the lotion is very poisonous and should be kept in a wooden barrel* out of the reach of animals and children.

If a syringe is not available, a long rubber tube with a funnel in the end will do, hold the funnel about a foot above the level of the cow's quarters and pour in the mixture from a jug. In a stable where a number of cows had aborted, I saw a barrel of the fluid hoisted up to the rafters and a long rubber pipe hanging from the bung hole, the pipe was passed into the cows in turn, and the fall caused the fluid to flow in freely.

In addition to the disinfecting of the cows the stable must be attended to, and if many cows abort in a herd, it will pay the dairyman or stock-breeder to put up another stable for their in-calf animals. Carefully sponge their hinder parts daily and treat the aborted lot in the old stable—scrape and wash the back of the stall and gutter, and scrub with a strong solution of Sulphate of Copper (Blue Stone) 5 ounces to one gallon water, repeat this disinfecting for a week, both the stall in which the aborting animal stood and the two adjacent on right and left hand.

It should be borne in mind that a cow which has aborted as a result of the disease, contagious abortion, can come in season, conceive, become pregnant and be sold and almost invariably abort and carry the disease to the cowshed of the unfortunate buyer; and that a bull which serves such a cow can also convey the disease to a cow he serves subsequently, and also sometimes, a cow after aborting three or four times and then carries her calf the full time, authorities say that even in that case the membranes and vaginal discharge contain the germs of the disease. In cows at pasture if the usual symptoms of parturition-discharge from vagina clotted around tail and are noticed in an animal which the owner knows is not due to calf, and which shews no traces of a reason for the abortion, careful search should at once be made for the slipped fœtus and membranes even if it is only a clot of blood, and when found some bush collected and the article at once burned and all the cows sponged over their hinderparts as described.

This disease, *i.e.*, contagious or infectious abortion, is much on the increase in the Cape Peninsula, due to the fact that cow owners find an aborting animal of little use for dairy purposes, feed her up and sell her, spreading, no doubt unknowingly, the disease to the cows of her buyer.

In addition to the stable disinfection the usual course in dealing with any infectious disease should be carried out and that is get rid of contaminated litter, disinfect milking stools and see that the man attending on the aborted cows doesn't, if possible, attend to the in-calf lot or at anyrate cleans his hands and wears a smock. Even streams may be suspected if there is an aborting herd near by or up that water course.

As a certain number of the cows will harbour the germ in the womb when treatment is started and we cannot syringe out a pregnant cow (which may have the disease germ in the fœtal membranes) it is not to be expected that abortions will cease at once, but by keeping up the treatment the trouble may be got quit of the following year.

AGRICULTURAL EXPERIMENT STATIONS FOR CAPE COLONY.

In Principle and Practice.

By Dr. E. A. Nobbs, Ph. D.

In spite of what is frequently said to the contrary, perhaps in jest, the average Cape farmer is generally deeply imbued with a desire to make the most of his land, and to better his condition. Furthermore, the average farmer in Cape Colony is decidedly more ready to listen to suggestions from without, to consider new ideas and learn from others, than he is given credit for. But he, like everyone else, prefers to have tangible evidence of the accuracy of what is being taught him.

Seeing is believing, and ocular demonstration goes further with him than any other process of reasoning. Again, in this country we are working under conditions full of new and untried possibilities, and with unknown factors whose influence it is impossible at present to gauge. It is expedient therefore, that all new ideas in matters of farming, before they are brought to the notice of our farmers, should be subjected to cautious trial and preliminary examination. In such matters it is impossible to expect farmers to experiment for themselves with things, of the success of which there is still some uncertainty. Failure is apt to be misconstrued, and it is impossible under ordinary farming conditions to devote that care and attention to minutiæ which is so essential to a full comprehension of problems still strange and unfamiliar.

It is the prime object and purpose of experiment stations to meet this difficulty, and to furnish means whereby the constant progress of scientific knowledge may be turned to the advantage of the farming industry. Not only the immediate results must be studied but the causes whether of success or failure. It is the duty of an experiment station to translate the results of science into the language of the farmer, first to investigate, and then to give instruction. The private farmer full of personal cares cannot possibly devote to scientific research that extremely precise and painstaking labour, that patient attention to detail and scrupulous accuracy which is essential if the discoveries made are to be regarded as reliable—without which they are useless. Furthermore, the work of the individual is for his own benefit, he has a right to the fruits of his own soil. Hence, the desirability of such researches being carried on, under Government auspices, at experiment stations scattered throughout the Colony, serving as centres for the acquisition and diffusion of knowledge amongst farmers, advising and helping them in their work, furnishing not crops of grain and forage for profit but for information, yielding crops of results and experience which shall, in turn, enable the farming community to increase its gains, and to extend its activities to new and profitable channels.

No better definition of the term can be given than that of Dr. A. C. True the Director of the Office of Experiment Stations of the United States Department of Agriculture. He says, "An agricultural experiment station is an institution in which scientific and practical investigations are made with a view to improving the methods of agriculture, or introducing new crops or industries. The primary object of an experiment station is to apply scientific principles and methods to the problems of agriculture."

An experiment station seeks to turn the discoveries of science to every day use for the agriculturist; to study the laws of nature so as to increase the profits of farming. It is therefore essentially a scientific institution, an open-air laboratory for research, with a view of first learning and then demonstrating the most advantageous methods of cultivating crops, working the land, and treating live stock.

An experiment station is not a farm, above all not a model farm, for where things are being tested and tried, where every field is cut up into a number of plots each differently treated, we cannot expect the place to assume the appearance of an ordinary farm run for profit or to be a pattern for others to imitate. Its chief business is to find out new applications of science to agriculture which shall result in improved practices and products. On its success depends not only the advancement of agricultural practice in particular regions but also the effectiveness of all institutions for agricultural education, for the experiment station supplies the material on which courses of instruction in agriculture are based.

Whatever any one station discovers of real and permanent usefulness can easily be disseminated throughout all parts of the country by means of the press, lectures and courses of instruction, and through the other stations.

While the object in view, the ultimate pecuniary benefit of the individual farmer, may be clear enough to all, the processes by which the results are attained will often appear to the public obscure, even absurd. Many experiments must have negative results, many attempts may fail, disappointments and difficulties are certain, yet they will lead to benefits and advantages which can be attained in no other way, moreover, experience of a negative character so learnt will save farmers these same failures and losses on a very much larger scale.

Quoting from an official report, the activities of experimental stations in the United States are summarised as follows:—

"(1) They act as bureaus of information on many questions of practical interest to farmers in the several localities.

"(2) They seek by practical tests to devise better methods, and to introduce new crops and live-stock, or to establish new agricultural industries;

"(3) They aid the farmer in his contest with insects and diseases in his crops and live-stock;

"(4) They help to defend the farmer against fraud in the sale of fertilisers, seeds, and foodstuffs;

"(5) They investigate the operations of nature in the air, water, soil, plants, and animals, to find out the principles which can be applied to the betterment of processes and products."

ORIGIN AND DEVELOPMENT OF THE IDEA.

The idea of applying the discoveries of science to the problems of agriculture, by means of actual field experiments, was first put into practice by Sir John Bennet Lawes at Rothamsted, in England, in 1843; the first experiment station in Germany was established at Mockein two years later, while a beginning was made at Middleton, Conn., in the United States, in 1875. Since then the value of this mode of study has been so universally recognised that almost every civilised country has accepted experiment stations as an essential portion of state aid to agriculture, and, according to the latest estimate, there are no fewer than 798 scattered throughout the world. In Europe only one country, Greece, is without them; every State and Territory in the United States has one or more stations, and the annual charge for their upkeep amounts to $1,000,000. In France and Germany there is an experiment station for every 8,000 square miles; seventy-four in the one country, and eighty-seven in the other. Japan has thirty-eight. Denmark possesses ten, and Holland can boast of seven. In the Austral an Colonies there are sixteen "State farms," which are exactly analagous to the experiment stations of other countries. Natal has four experiment farms. Cedara, near Pietermaritzburg, which is the central station, was started in 1902, and is very completely equipped, and work is carried on with experimental arable farming, experimental orchards, a model farm, and forest forest nurseries, a stud farm, as well as a considerable extent of land worked for profit. The whole area is 3,614 acres. Winkle Spruit, 500 acres in extent, devoted to the special problems of the south coast, only commenced operations last year, while the northern coastal districts are served from Stanger, having a quite recently started station. The fourth experiment station, an area of 59 acres, is situated on the Weenen Irrigation Settlement.

There are in the Transvaal five experiment stations. The central one at Potchefstroom is replete with every requisite for the study of the problems of that country, and the work is carried on on a very large scale, the farm itself being 2,700 acres, of which 800 are under cultivation, while specialists in agriculture, horticulture, forestry and poultry-keeping, as well as a district veterinary surgeon, are all resident on the farm. The other experiment stations are at Ermelo, Tzaneen, Springbok Flats and Lichtenburg, and are not to be confused with Government stud farms at Standerton, and near Pretoria.

In the Orange River Colony, also, there is at least one experiment station—that at Tweespruit, which is also a stud farm and Government creamery.

Rhodesia has had an experiment station since 1903.

Naturally the varying conditions and requirements of different countries give occasion for considerable variation, and the term experiment station (*Versuchs-station* in German) has come to include agencies of all kinds and grades for experiment and investigation in agriculture, and for the protection and information of farmers. Thus, the German stations undertake analytical chemical research, and control, by frequent examination, the quality of the seeds, foods and fertilisers sold in the neighbourhood; the English stations are usually associated with educational institutions or agricultural societies. In America the study of natural sciences in their relation to agricultural practice, such as vegetable chemistry, soil physics, botanical physiology, and the like, have formed the basis from which experiments into the practical application of the laws of Nature to ordinary farming operations have been conducted. Formerly the American experiment stations were closely connected with the colleges, but now "it becomes more apparent that, in order to perform the most efficicient service the station should be organised strictly as a separate department."

The earliest mention of experiment stations in Cape Colony is a brief line in the report of a select committee in 1894, referring to "proof stations under the Agricultural Department, which are an urgent want." Since then the matter has from time to time been raised, and, latterly, very persistently, by societies and associations and by the Congresses and Unions of these bodies. The subject has been frequently discussed, and the idea has steadily been growing in public favour, until, at last, in spite of the severe retrenchment found necessary last session, a small sum was voted by Parliament, and a commencement is now being made. The principal outlay upon an experiment station naturally falls at the beginning, when land has to be secured, buildings erected, implements, and stud and draught animals purchased and fed with bought forage for the first season. The average annual cost of an experiment station once fully equipped varies according to circumstances, on an average it has been found in France, Russia and Norway to be £500; in Hungary, £1,000; in Austria, £1,200; in India, £1,400; in Switzerland, £2,000; and in Germany, £2,500. But these latter are very elaborate institutions.

THE INTENTIONS OF THE GOVERNMENT.

In view of the limited funds at our disposal it is only possible this year to make a small beginning. The original intention was to start one experiment station, and for this a sum of £5,000 was deemed sufficient and was voted. But in view of urgent demands made, it was later on resolved to commence at three separate centres; one on the South Coast, one in the Western Province and one in the East. Of course, the sum adequate for one cannot be sufficient for three, so that it will only be possible to make a commencement this season, trusting to future years to fully furnish the experiment stations. A proper equipment is essential to enable the stations to grapple with the problems of our agriculture in a broad and thorough manner. There are a number of suitable sites in view, but the conditions necessary are somewhat complex and difficult to find. Firstly, the experiment station must be located at a place typical of some considerable portion of the Colony in order that its sphere of influence may be as large as possible. The soil and situation must, in so far as possible, be characteristic of the neighbourhood, not the most fertile spot and not the poorest, but just a good all-round average of the neighbourhood. Further, the experiment station must be conveniently and centrally situated, so that it may be readily visited from all sides; for it is hoped that these places will become the frequent resort of farmers wishing to inspect the experiments and see for themselves what is going on. Finally, wherever possible, the land must be already Government property, or to be had on exceptionally favourable terms. So far, in this last respect, the Department has been very fortunate in obtaining, in one case, a long lease from a Municipality on a considerate basis, in others receiving generous offers from public-spirited private individuals. Elsewhere, certain sites in view are actually Government land.

One of the chief difficulties which has had to be met lies in the fact that this Colony is divided up into a number of regions totally distinct in their character and each clearly marked by more or less abrupt natural boundaries. Karoo, grass-veld and sour coastal bush-veld are three main classes, but these again may be subdivided, according, chiefly, to altitude, rainfall, and the time of year of the rains, into numerous zones or areas, each with its own peculiarities, advantages, draw-backs, and consequent problems. It is for this reason that it has been decided not to establish one large, central experiment farm, supplied with all the latest aids to scientific research, such as characterise the American institutions, but rather to have a number of smaller, humbler stations concerned with the immediate pressing problems of the day, in closest touch with the farmers of their districts and working along practical lines, leaving for the future to provide us with the elaborate requirements of more highly specialised research.

The equipment is a matter demanding very careful consideration. While strict economy is essential, this must be subordinated to the experimental character of the object in view; as far as possible every foot of land and every building and tool about the place must be serving some purpose of experiment.

In the United States the buildings include offices, museums, libraries, chemical, botanic, bacteriological and other laboratories, dairy buildings, farm buildings, barns, silos, plant houses, insectaries, and other special buildings. We must content ourselves with very much less pretentious arrangements. The ordinary farm buildings on a small scale must suffice.

Implements and apparatus in considerably greater variety than are customarily met with must be kept for the purposes of trial and comparison. It is not proposed slavishly to follow in the lines of America, England, or any other country, but rather to profit by their experience, and to adopt from each whatever is applicable with advantage and to adapt freely to our peculiar needs and circumstances.

LINES OF WORK.

The possible lines of work are many and various. The study of the soil itself, its character and composition, is the first item. The investigation of the effects of the application of artificial manures opens up an endless subject. A few favoured spots require no manure, but in most places it is of the utmost importance to discover, as soon as may be, what manures are effective, in what quantities they should be given, and at what season and in what form and manner they are best applied. The study of these and kindred matters will take a considerable amount of time and work, but will well repay the labour spent upon them.

Questions connected with irrigation and drainage and the movements of soil-water, the measurement of streams and of the amount of water required to produce any particular crop are of the first importance, also the seasons and modes of applying the water.

It seems very desirable that an attempt be made to introduce into this Colony crops that are grown in other countries possessing similar climatic conditions. The number of crops grown here is surprisingly few. At first such new plants must be tried on quite a small scale. Such crops as appear to promise well may then be further tested in various situations, so that information may be collected as to their requirements and peculiarities. If by this means, and after some years, only one or two grasses or other plants should be added to the regular crops of this Colony, a great and valuable work will have been achieved.

Another line of work that must be taken up is the trial of different varieties of our customary crops, in order to improve both the quality and yield, and to introduce to every district the kinds most suitable to it. In close connection with this, attempts will be made to discover more rust-resistant wheats, oats, and ryes than we now know; also the production of such varieties by artificial cross-fertilisation. This class of experiment, termed "plant breeding," requires several consecutive years of trial before any reliable data can be published.

In certain parts there is much need to try by some means to restore and improve our veld, and as research work of this description must necessarily take a long time before results can appear, its early commencement is accordingly the more urgent.

The trial and introduction of new machinery and tools will form an important part of the work of the experiment stations, and it is proposed to hold public trials and demonstrations of any which may commend themselves.

Various methods of preparation and subsequent cultivation of the soil and the use of new tillage and other implements will be experimented with, new methods of harvesting and storage of crops, as in the case of lucerne, treatment and curing as with tobacco, indeed every suggestion for improving either the quantity or quality of our crops will be given full trial, and no opportunity be lost of trying to improve our methods.

What livestock it is necessary to keep on the place to profitably utilise the crops grown will be the best of their kind obtainable, in order that the experiment station may also be a source of benefit to the breeders of the district.

According to the nature of the locality, and in order to avoid unnecessary overlapping of work, each station will specialise in some particular brand, be it dairying, horticulture, irrigation, ostriches, tobacco, or whatever else may be required.

As recently pointed out in a memorial on the subject addressed to the Department by the Western Province Horticultural Board: "Whilst acknowledging that it is not the business of an experiment station to make a profit, we think that the work should be thorough rather than showy, and that the results will prove to surrounding farmers that by working under other conditions operations can be made profitable. We do not want to be shewn how to grow potatoes, etc., but how to grow them in certain soils at a profit. Again we do not want to be merely shewn how to make wine, but to make wine that will command either a local or foreign market. We want to be taught how to feed a cow with the *minimum* of food to produce the maximum amount of milk or butter."

It is intended that the supervision of co-operative experiments at present carried out from Cape Town will ultimately be transferred to the charge of the managers of the experiment stations.

At the present time experiments are being conducted by the Department in conjunction with farmers throughout the Colony as follows:—

Manurial experiments—266 plots on 18 farms.

Bacterial fertiliser for leguminous crops—57 plots on 32 farms.

Prickly Pear Eradication on two farms.

Crop experiments with:—

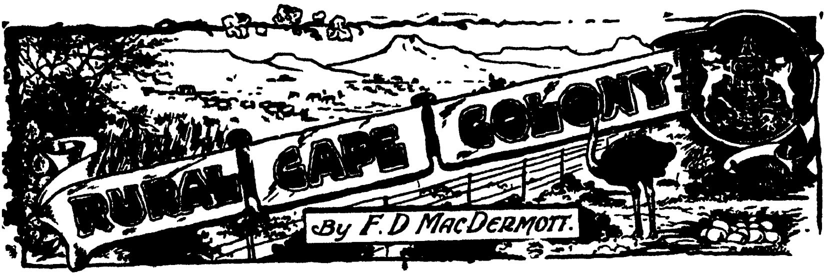
(*a*) Cereals—160 plots on 94 farms.

(*b*) Grasses and forage crops—1,273 plots on }
New crops 1,271 plots on } 485 farms.

The numbers are increasing steadily. The continuance and extension of this work is highly desirable, and it is felt that through the managers of the experiment stations an even larger number of farmers may be assisted in this manner, while the duties of inspection will be greatly facilitated and the value of the work increased.

Besides the work of original research it will be necessary to do a considerable amount of repetition both for verification and demonstration of previously proved facts. The results of experiments must be published broadcast in order that the maximum benefit may accrue from work done.

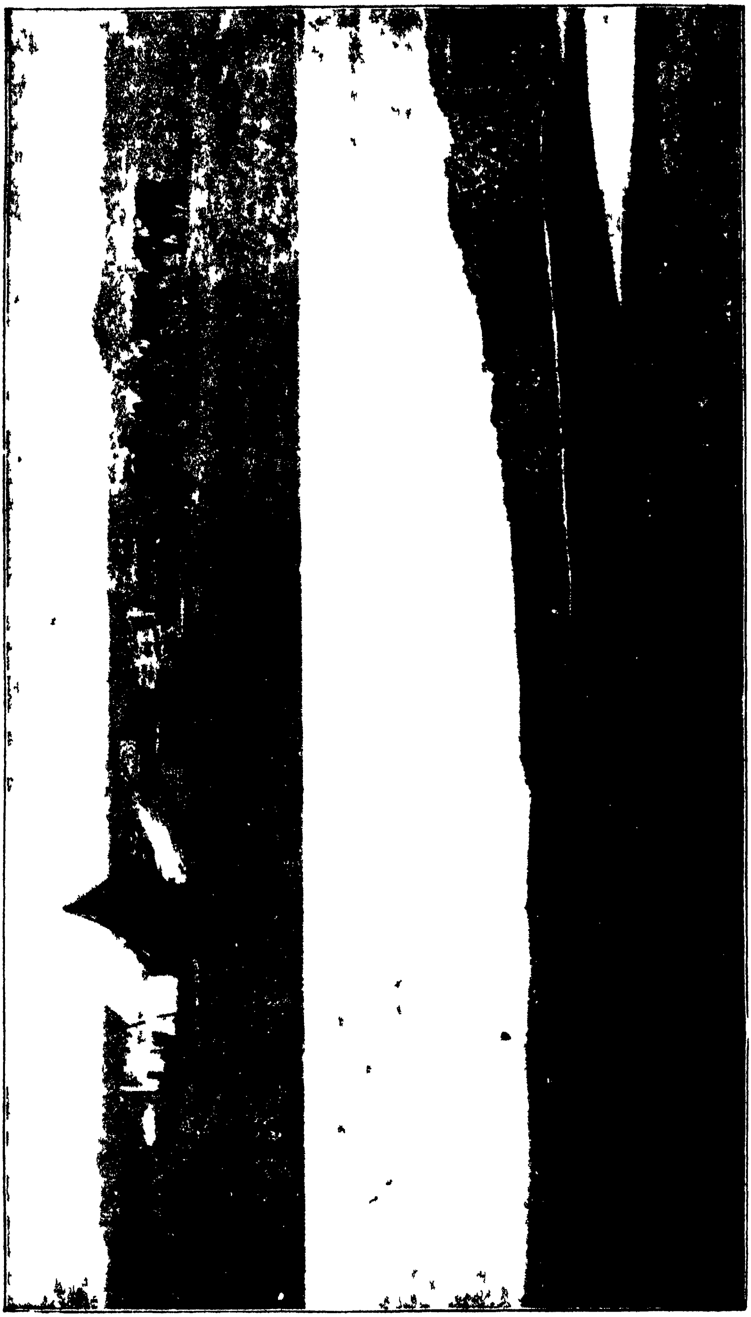
It is hoped that it will be possible in future years at our agricultural shows to exhibit tokens of the activity of the experiment stations, and to utilise these gatherings for the further dissemination of knowledge gained. In this way it is confidently anticipated that the experiment stations—provided that they are thoroughly equipped from the outset and that they continue to receive encouragement from the farming community, and are properly supported and made use of—will be a powerful influence in adding to the sources of wealth and of increasing the sum of our knowledge of the science and art of farming in Cape Colony.



NO. XVII.

THE DISTRICT OF COLESBERG.

The physical conditions and the magnificent climate of the District of Colesberg long ago indicated its almost perfect suitability for stock-farming in all its branches, but the vicissitudes of drought, and other disturbing influences have left so deep a mark that a great deal of progress which would undoubtedly have otherwise been made, has now to be discounted. But with all these drawbacks and a particularly unfortunate situation during the late hostilities, the district is shewing more encouraging signs of advancement just at the present time than most of the more remote sections can boast. In soil and situation Colesberg has many advantages. It is some 300 miles northward from the coast line, and lies at a mean elevation of something like 3,500 to 4,000 feet. Its northern boundary is the Orange River and to this fact a good deal of the fertility of the district seems due. The Zuurberg Range forms a large proportion of the southern boundary and thus forms a watershed to the Orange River which gives the district a great deal of surface water which runs down in the form of small rivers and spruits. Among these the most important seems to be the Oorlog Spruit, while next comes the Zuurberg Spruit. Along both these streams a great deal of work is now going on in the shape of conserving and utilising the flood waters which have run to waste in the past. Another important stream upon which good work is now being done is the Seacow River on the western side of the district, but as I did not manage to get so far during my visit to the district I am not in a position to say very much about it except from hearsay, The whole section is practically devoted to stock, including horses, cattle, sheep, goats and ostriches. Some agricultural farming is carried on, but mostly as an adjunct to the stock side; while of fruit it may safely be said that very little is produced except in the shape of gardening. Sheep are a very important factor in the husbandry of the district, and among these I saw some exceptionally fine merinos, of various



Water Developing at Rietfontein

Dam at Ventersfontein and Site for New Works types. The majority are, practically speaking, South African, for they are quite a type by themselves, and stand out strongly in their individuality. For general utility purposes the bulk of the sheep I saw seemed to be very good. The demand of the butcher for carcase is not being over-looked either, and some very large and thriving flocks of cross-bred Persian-merinos are growing up which are reputed to be a very profitable investment to their owners. The virtues of this tribe are so well-known now that there is little necessity to dilate upon them. The only regretful feature about the introduction of the Persian to this district is the fact that they are not only being farmed for themselves but they are taking the place of woolled sheep on many of the farms. Since the droughty seasons have set in with such continued severity, the sheepmen have been gradually driven to the conclusion that the heavy growth of what they call "steekgras" is such a terrible drawback to the production of wool as to make that industry almost prohibitive on some of the farms. There is no doubt that the steekgras detracts greatly from the value of the wool, for in some cases I have seen the fleece so terribly matted with the small seeds of this plant as to become practically valueless. It is a serious problem therefore for the sheep farmer to solve. Many of them are parting with their merinos with the deepest regret but it is largely a case of Hobson's choice. It is to be hoped that with the recurrence of the seasonal rains which are now anticipated, the steekgrass will disappear and with it the necessity of doing away with woolled sheep in a locality which is so well-suited for them in every other respect. The district is a good one for cattle of all kinds, and in time should develop an important dairying industry, for, with the main line of railway running through the centre, there is no reason why it should not cater for the largest markets in the country, Ostriches also thrive well here and in time this industry promises to make great progress. Some very excellent types of birds have been recently introduced by the more progressive new comers who have recently settled down. The stock industry by which the district is best known, however is that of horse-breeding; for some of the most successful thoroughbreds that South Africa has produced have been bred in this district. And at the present time there is little indication that this reputation is likely to suffer, for several of the best stallions in the country and some excellent mares are stationed here, with every promise of producing first-class racing stock that should make a name for itself. These I shall deal with when touching upon the various farms I visited.

SOIL AND WATER.

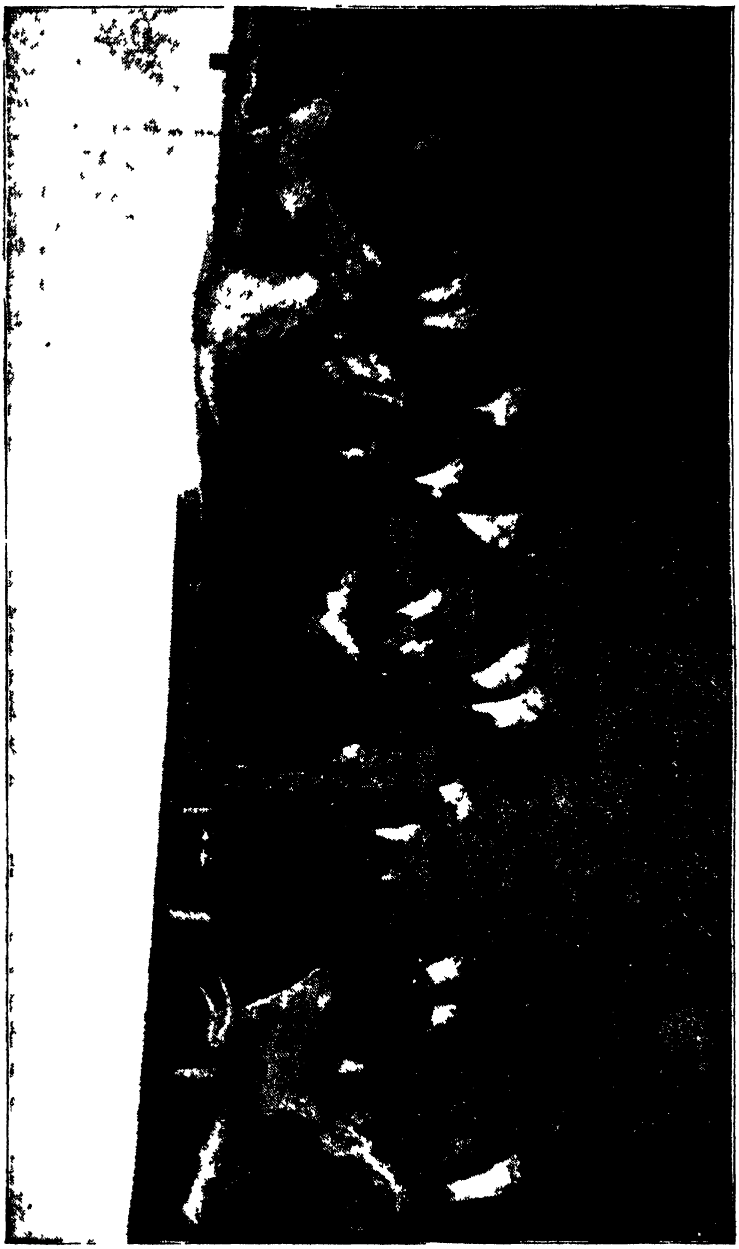
The soil of the district is mostly Karoo, in some places very deep, while at intervals the underlying shales come right up to the surface, and crop out rather prominently. But the whole district seems to contain a large proportion of lime, with the result that a great deal of lucerne has been laid down and all the schemes of development include large areas of this valuable fodder plant. The drainage in most cases is excellent, while the subsoil moisture is so great and so near the surface that water is found in large quantities within from twenty to forty feet almost anywhere in the district. The underground waters are the centre of interest wherever one turns, and water development is proceeding on nearly every farm where the proprietors have sufficient energy to carry on the work. It is taking all forms. Water drills are being employed, springs are being opened up, dams are being built to catch the surface drainage and the flood waters, spruits and sluits are being dammed and filled in to throw the flood waters over the veld, and every known device seems to be brought into requisition in one place or another in order to add to the moisture contents of the ground. The satisfactory part of it all is that success is attending most of the efforts put forward; at least I heard of very few failures except in one notable instance on the Zuurberg Spruit where an intelligent and energetic young farmer was using a diamond drill on a site indicated by the divining rod as a promising spot to sink on. Up to the time I left, nothing but disappointment had been met with, and the farmer's patience was gradually becoming exhausted. It is to be hoped that success may ultimately attend this well-meant effort.

MANURES AND MANURING.

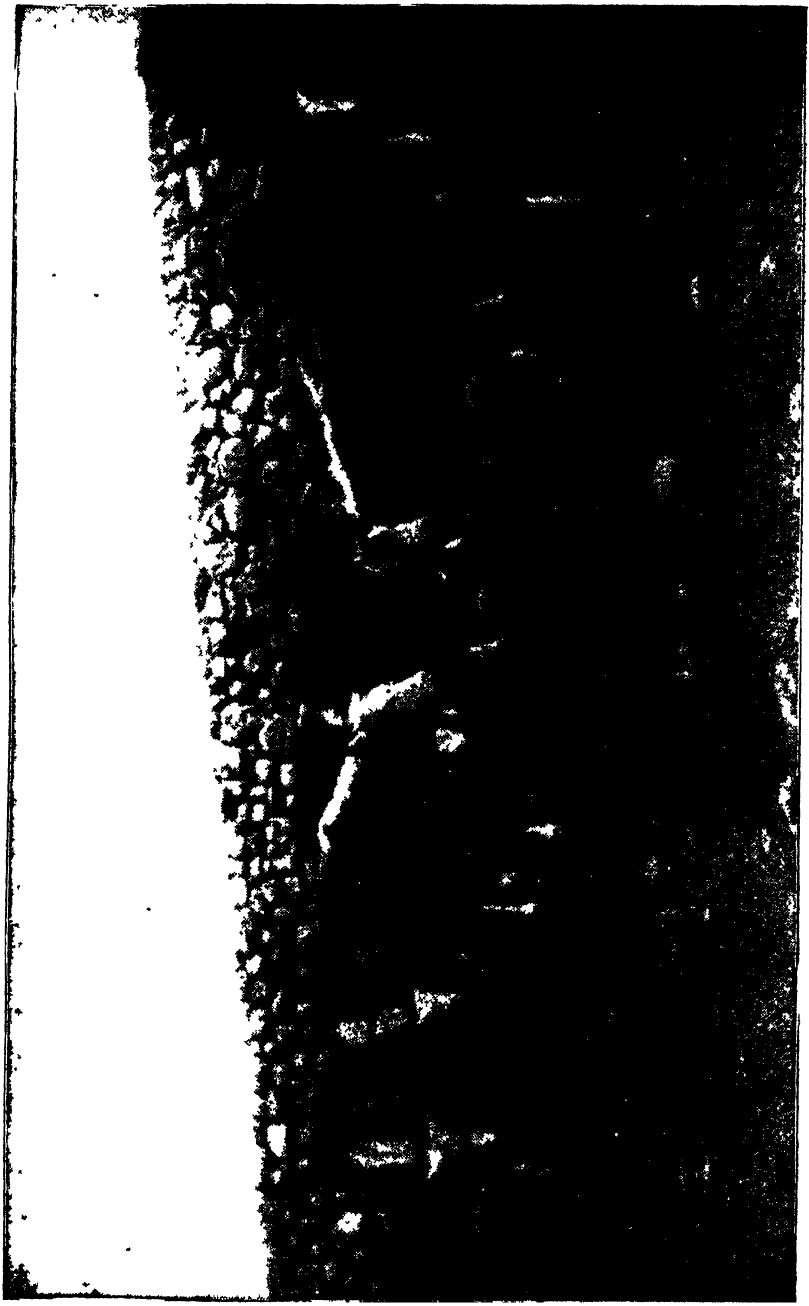
So far the question of manures and manuring, except perhaps for garden crops and potatoes, has not arisen in the acute form, and should the development proceed along the lines which seem most natural, namely permanent pasturage and stock raising, it is not likely to for a long time to come. All the crops I saw there looked so healthy and vigorous that one could scarcely think of such a possibility. With the establishment of lucerne on a field scale and the conservation of the natural herbage of the country—the more succulent of the Karoo bushes—there can be little need for the application of fertilisers for many years to come. Whether the district will ever develop industries demanding intensive cultivation time alone can tell. Judging by what has taken place in other countries it would be safe to say that this must come later on; and when that time comes the question of fertilisers may arise, but so far as present indications can be judged that possibility seems a good way off yet.

PHYSICAL FEATURES.

The country immediately around Colesberg itself—that is the town—is bouldery and full of kopjes, the most prominent being the famous Coles Kop upon which General French mounted his guns during the war, and thus dominated so large an extent of country. This can be seen for many miles. But otherwise, except in the immediate vicinity of the Zuurberg, the most striking feature of the natural formation is the peculiar depressions which seem to exist everywhere in regular series, each surrounded and contained by irregular ridges giving an appearance largely approaching that of gigantic shallow dishes. The bottoms of these depressions are fairly flat with a slope that seems most suitable for irrigation



Hereford Cattle at Rietfontein.



farming, and this fact is being taken advantage of to a very great extent in the construction of the dams and the laying out of the lands for crops. With water on the upper slopes of these depressions it should be possible to produce most satisfactory results from irrigation works, and on every side efforts are being made to develop the water supplies in such a way as to bring about this result. In some cases the small poorts or gulches which connect these series of depressions with one another are utilised by constructing dams in them to conserve the drainage, in others underground waters are being opened up in order to throw a supply on the lands around. If nature had set to work to create a set of conditions that should be favourable to this particular class of cultivation it seems doubtful if she could have improved much upon some of the better favoured of these belts. The rocky hills around the depressions act as containing walls, for it is seldom that boring does not give fairly good results shewing how much moisture is held in the soil by the peculiar formation mentioned. What seems to make them the more valuable is the fact that so many of them seem to drain into each other so that even in the worst of droughts the fears of a water famine are never quite so deep-founded as in other parts of the Karoo. This may be accounted for also by the comparatively gradual fall in the watershed from the foothills of the Zuurberg to the Orange River. The mountains catch the moisture and instead of it rushing away through water courses it drains more slowly through these depressions until it reaches the river. It is a notable fact that in the worst of seasons there are many strong fountains which never fail, and even in the river beds water can be impounded and conserved in long pools by comparatively shallow weirs. The indications in fact all go to support the theory that there are large supplies of subsoil water all over the district which only need to be tapped to make it one of the most valuable sections for stock farming in the Colony.

MILLIONAIRES AS FARMERS.

Next to the physical features of the district the most interesting point connected with it is the number of very rich men who have taken up land there and gone in for farming on a large scale. It has to be admitted at the outset that the attraction with the majority of them has been the excellent advantages which the district offers for horse breeding. The Hantam horse was known and had a reputation long before that part of the Colesberg District attracted the attention of the rich men who now have their stud stables there. In fact it was for years the recognised home of some of the finest equine stock this Colony could boast. But since the advent of wealthy men like Mr. Abe Bailey, the well-known owner of thoroughbred racing stock, Mr. H. Nourse, another owner of first-class thoroughbreds, with Mr. L. E. B. Homan, and Mr. Alec. Robertson, the district seems to have a future of greater brilliancy than its past in the line of horse breeding. In addition to the above-mentioned horse-breeders, I may mention that Mr. Cor.

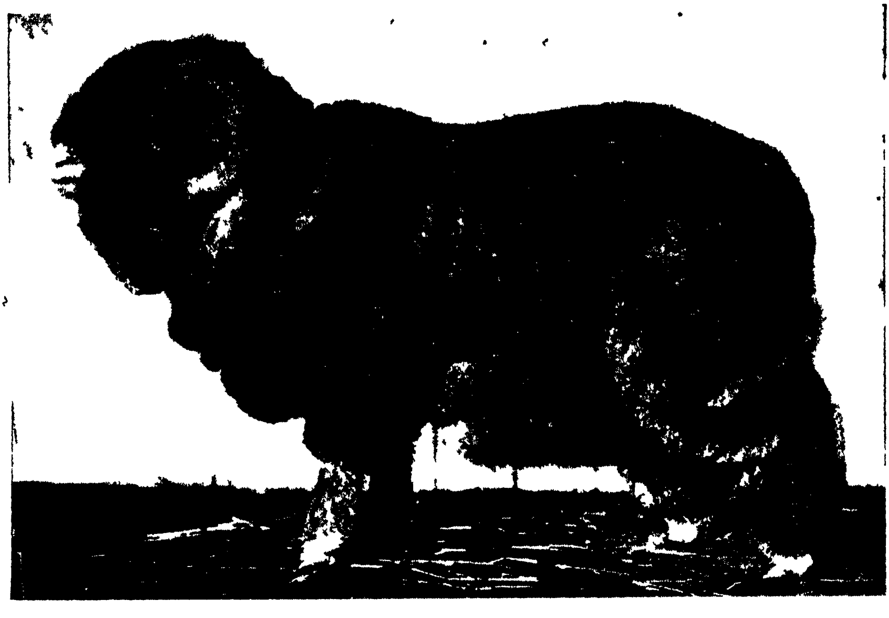
Rissik, of Johannesburg, has taken over a magnificent property on the Oorlog Spruit, known as Grootfontein, which he is now developing by the free outlay of money; while another large group of farms higher up the same water course is held by a powerful syndicate and is now awaiting development and settlement as soon as the prospects are more promising. It is doubtful if any other district in the Colony can show such an array of very rich landowners—though more and more of the wealth accumulated at the gold and diamond mines is being devoted annually to the development of agriculture in this Colony. Whether the advent of such men to a district is of advantage or not, all round, is a moot point with some people. The small traders in the towns do not like it, because such men have a very natural tendency to do everything on a wholesale scale, with the result that the local man frequently feels that a good business is going past him direct to the merchant at the port. But even allowing this to be no improvement on the old days of small things so far as the local trader is concerned, it must surely be conceded that development on so large a scale is better for the district and the Colony as a whole, than the stagnation which was the distinguishing mark of so many of the properties now being actively exploited. The advent of new men with new methods is sure to cause something of a revolution in a small community; and when the newcomers are strong enough to stand alone and go their own way, the transition stage is bound to catch someone or other on a sore place. One can only hope that the developments will proceed at such a pace that the inflow of prosperity will come soon enough to make up for the losses caused to local traders by the change in the conditions. It is scarcely fair to judge of such enterprises by the initial stages, as so many are apt to do; the true verdict cannot fairly be given for some years yet. Meanwhile energetic development is going on and at a great pace, which I shall be able to shew in my notes on some of these properties, and once the flowing tide sets in, it is bound to help the whole district.

RIETFONTEIN AND VENTERSFONTEIN.

Among the first of the more important farming propositions which I was enabled to visit were two of Mr. A. Bailey's, the farms Rietfontein and Ventersfontein. These are situated alongside the station at Arundel, and as this was my "jumping-off place," and I was fortunate enough to meet Mr. M. B. Webb, the general manager of all Mr. Bailey's properties in this district, I was soon in a position to gather as much information as I wanted. These two are now worked practically as one property, and are being conducted as cattle and sheep farms. The next farm lower down the line, which is part of the original farm, Rietfontein, is the property of Mr. Rensburg, and as this is also run on the same lines—with the requisite deductions to be allowed in the case of an old established farm—what may be said of these two largely applies in that case. The first and most important work undertaken by the new management is that of water development. In the views herewith will be

Thoroughbred Tasmanian Ram, "Cordite," by "Amberite," bred by Mr. E. Gibson, of Tasmania.

seen some of the schemes now coming to fruition and if every attempt in this direction meets with the same success there can be little doubt as to the future of the district as a whole. On Rietfontein there is excellent natural grazing with extensive vlei lands which in good seasons can be made to carry large numbers of both large and small stock, with the possibility of dairying in the future as well as meat and wool. But it was first necessary to make sure of water and to that end the drill was set to work, with the result that strong supplies were struck very near the surface. With this to work upon, and the further supplies opened up from the springs, Mr. Webb has developed, in addition to the natural pasturage, a goodly stretch of lucerne. But he is not altogether satisfied with this, and is now busily engaged in planning mechanical contrivances to lift the water so that he can bring a much larger area under that valuable crop, and so make the property proof against drought and bad seasons One great natural advantage is that all the underground waters struck in this district seem to be of excellent quality, so that nothing so far stands in the way of success. Windmills of various makes are being used for lifting the water, and once it is run into distributing reservoirs on the hills the rest is done by gravitation. This work, however, is rather expensive because it calls for the use of a good deal of piping, but even allowing for the expense the scheme has every prospect of proving highly remunerative. In addition to the underground waters, large dams are in course of construction which,



Thoroughbred Tasmanian Ram, "No 1 Patron,' by Australian Grand Champion (1905) "Patron," bred by the Hon James Gibson, of Bellevue, Tasmania it is estimated, will allow of further extensions of the lucerne crops, and thus enable these properties to carry more and more stock as time goes on.

On Ventersfontein the same plan is being carried out, so that the day cannot be far distant when the output will be something considerable. The class of stock at present on these two farms is of a good uniform quality, but with the schemes now in progress it should be highly profitable to carry the best stock available, when the advantages will soon become apparent both from the financial and cultural points of view. A beginning has been made with a herd of Hereford cattle of which a good deal is expected, but this may be looked upon largely in the light of an experiment.

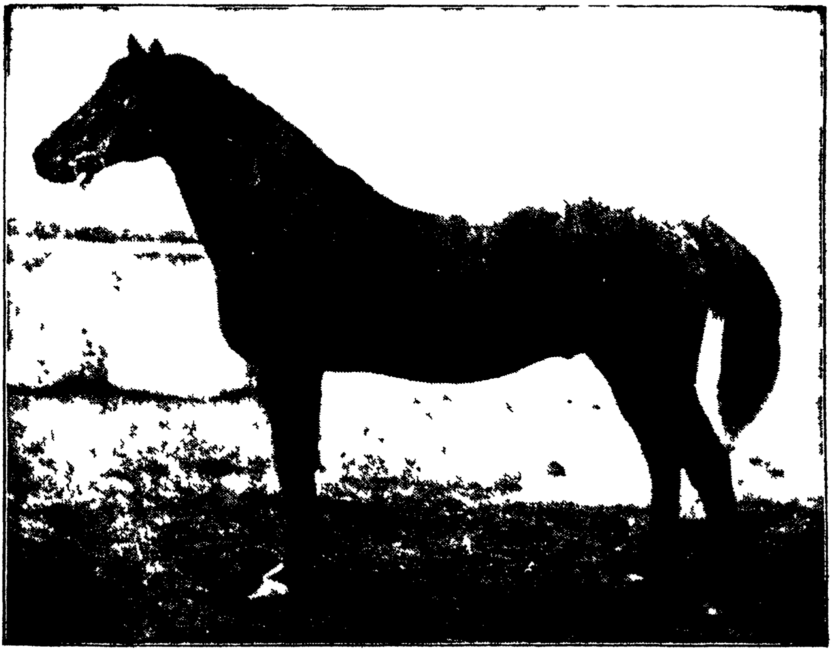
IMPORTED AUSTRALIAN MERINOS.

The most important stock feature of these two properties so far is the Merino sheep. A flock of excellent South African merinos from the stud of Mr. J. H. King, of Tarkastad, has been introduced and is doing very well indeed. But the desire is to do something better still. With this object in view Mr. T. T. Hoole, the well-known merino breeder of Atherstone, near Grahamstown, was commissioned, while on a recent visit to Australia, to select some first-class Australian merinos and bring them back with him. In this Mr. Hoole succeeded admirably, for he brought over the rams and ewes mentioned in the *Agricultural Journal* last month, and these are now safely installed at Rietfontein. Mr. Hoole visited most of the more prominent stud establishments of Australia and Tasmania and as a result secured two Tasmanian rams of excellent quality, bred by the Gibsons. With this article we are enabled to reproduce photographs of these sheep. The one ram, Patron I, was bought at the Sydney Ram Sales for £315, and was looked upon as the cheapest ram sold this season, so Mr. Hoole may not only congratulate himself on his judgment, but also on his luck. I understand that the price fixed for this ram was £600 before the sale, and that an offer of £500 was actually refused for him. He is of the noted President strain, and was bred by the hon. James Gibson, of Bellevue, Tasmania. His sire, Patron, was considered to be the best fine-woolled merino ever bred in Tasmania, so there is hope that something good may come of the introduction of such good blood. It has yet to be seen whether this type of sheep will suit the Karoo with its peculiar conditions, but handled with care there is really little reason to doubt that some good will come out of it. The other fine-woolled Tasmanian is Cordite, a son of Ambérite, the sire having been sold for 600 guineas last year. He was bred by Mr. E. Gibson, and is also calculated to leave his mark in this country. In addition, some seventeen stud ewes from the Gibson flocks have been brought over, and seven rams of the Havila type, a more robust, larger framed sheep, more of the character of the sheep bred by Mr. J. H. King, in this country. There is plenty of room for hope in the future that something of advantage to the sheep industry of the Colony should evolve out of this experiment, Another feature of interest is the poultry at Rietfontein. Though not an important factor at present, it promises to assume larger proportions later on, and, with excellent stock to start on, the future is bright. The special breeds most noticeable are the Wyandottes, some of them prize birds, and they are thriving apace. When the lucerne is thoroughly established and there is plenty of spare feed, the management should see what can be done with a good type of pig, In such a climate and on such a soil they should prove a profitable annexe to the general stock, particularly as there seem to be good facilities for bacon curing.

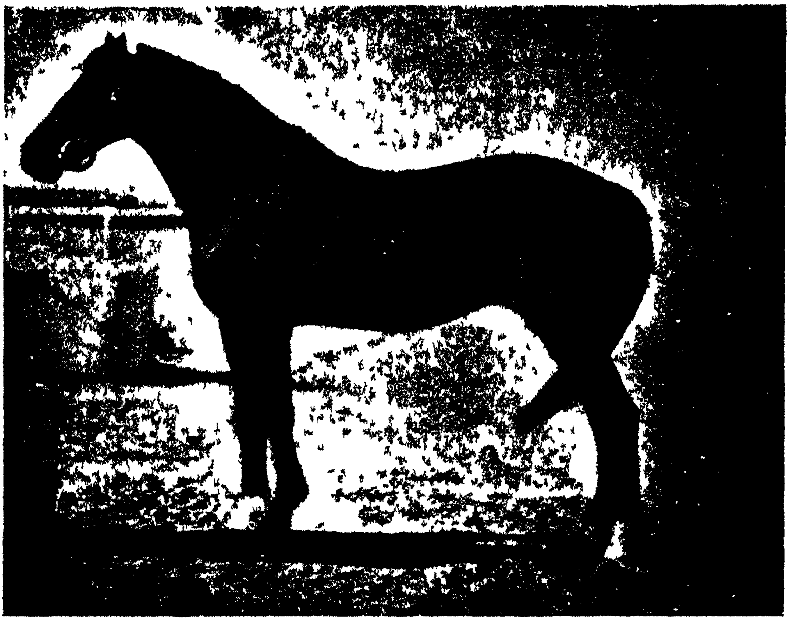
THE THOROUGHBRED STUD AT HOLLE RIVER.

From Ventersfontein I went over through Slingersfontein to Holle River, another large farm owned by Mr. Abe Bailey, where all the thoroughbreds are kept. This and the adjoining property of Kleintoren, which also belongs to Mr. Bailey, are situated on the banks of the Oorlog Spruit a little way above the section of country crossed by the railway just before it reaches Colesberg Junction. The Holle River itself is a small stream that empties into the Oorlog Spruit, just about the junction of the two farms, so that there is plenty of scope for irrigation works and every form of enterprise that may be expected to help in the conservation of water. The principal crop at Holle River is thoroughbred horses, and to this end most things on the farm are subordinated. An excellent flock of Merino sheep is run there, but the thoroughbred horses seem to be the main interest. When I state that there are no less than six thoroughbred stallions of the first class kept on the farm for breeding purposes, and that among them are some of the most valuable horses in South Africa at the present day, it will be readily seen that they involve a good deal of responsibility, and take up a great deal of attention. In addition, there are fifty thoroughbred mares, and about a hundred country mares of various types. A troop of stock like this calls for some handling, and it is more than gratifying to be able to state that they are treated with both care and intelligence, under the management of Mr. M. B. Webb, and the capable staff he has with him. The leading feature, therefore, of Holle River is first the stallions, and among these the most striking is Leisure Hour, the horse that attracted so much attention at the Rosebank and Port Elizabeth Shows. In Leisure Hour Mr. Bailey has a grand asset, the full value of which has yet to be demonstrated. Like all the St. Simon stock he combines good looks with great stamina, and always evokes admiration. Great things are expected from him, though it is early yet to offer any opinion as to what his stock may do. His first foals in South Africa had been dropped a week or two before I visited the farm, and I had the pleasure of photographing them with their dams—shewn on another page. The youngsters are excellent and promise well. They are well set up, and shew many favourable points that should help them as they grow. The one foal is to North Star and the other to Miss Collingwood. The other stallions on the farm are Vichy (too restless to photograph), Stuart,

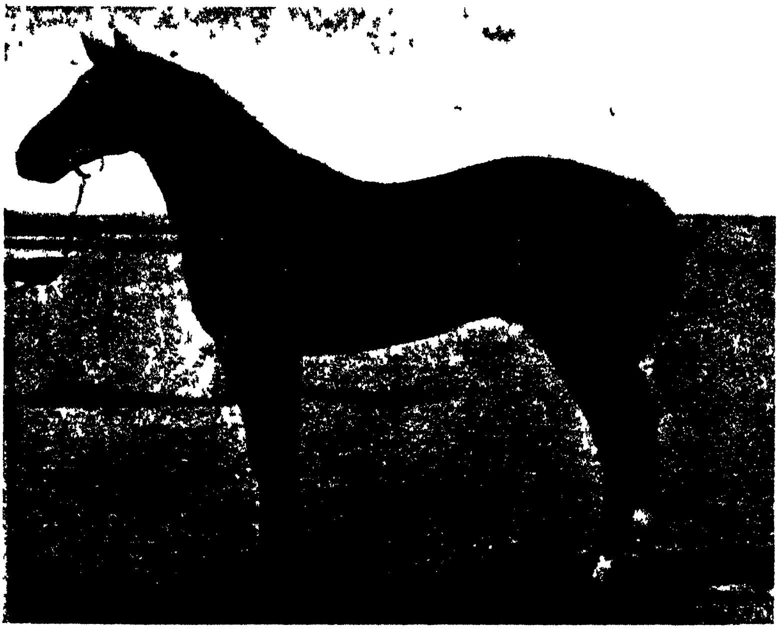
Thoroughbred Stallion "Leisure Hour"



Thoroughbred Stallion "Stuart"



Thoroughbred Stallion " Philter "

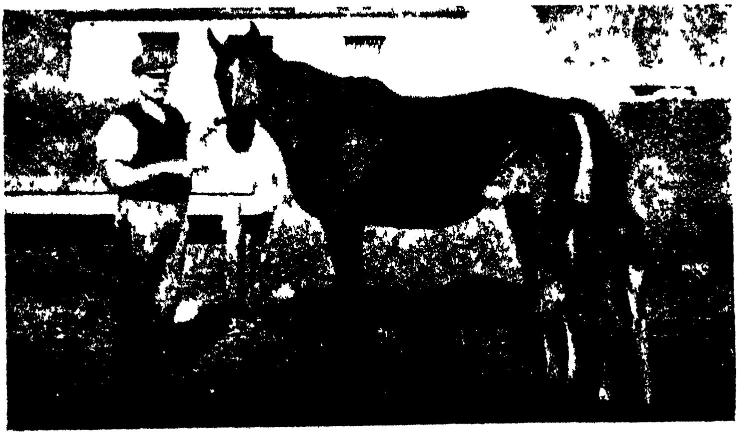


Thoroughbred Stallion " Kempton Hoo '

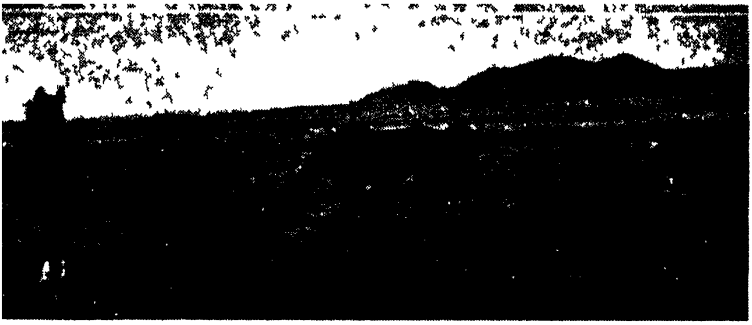
Thoroughbred Mare "North Star" with "Leisure Hour" foal, two weeks old.

Philter, and Kempton Hoo, all in grand condition. Quite an extensive range of loose boxes are fitted up for the thoroughbreds at Holle River, and the buildings are of a most substantial nature. Ranges and ranges of stables are also available while there is plenty of excellent grazing and lucerne for the youngsters.

Some very interesting works are also being carried out on the two farms, with the object of increasing the water supply. A very large dam exists on Holle River, which holds a great quantity of water even in the dry seasons, being built in the bed of the water course. A goodly proportion of land is brought under cultivation here, the water being supplied by this dam and some springs higher up. But the future holds much more ambitious projects. The Oorlog



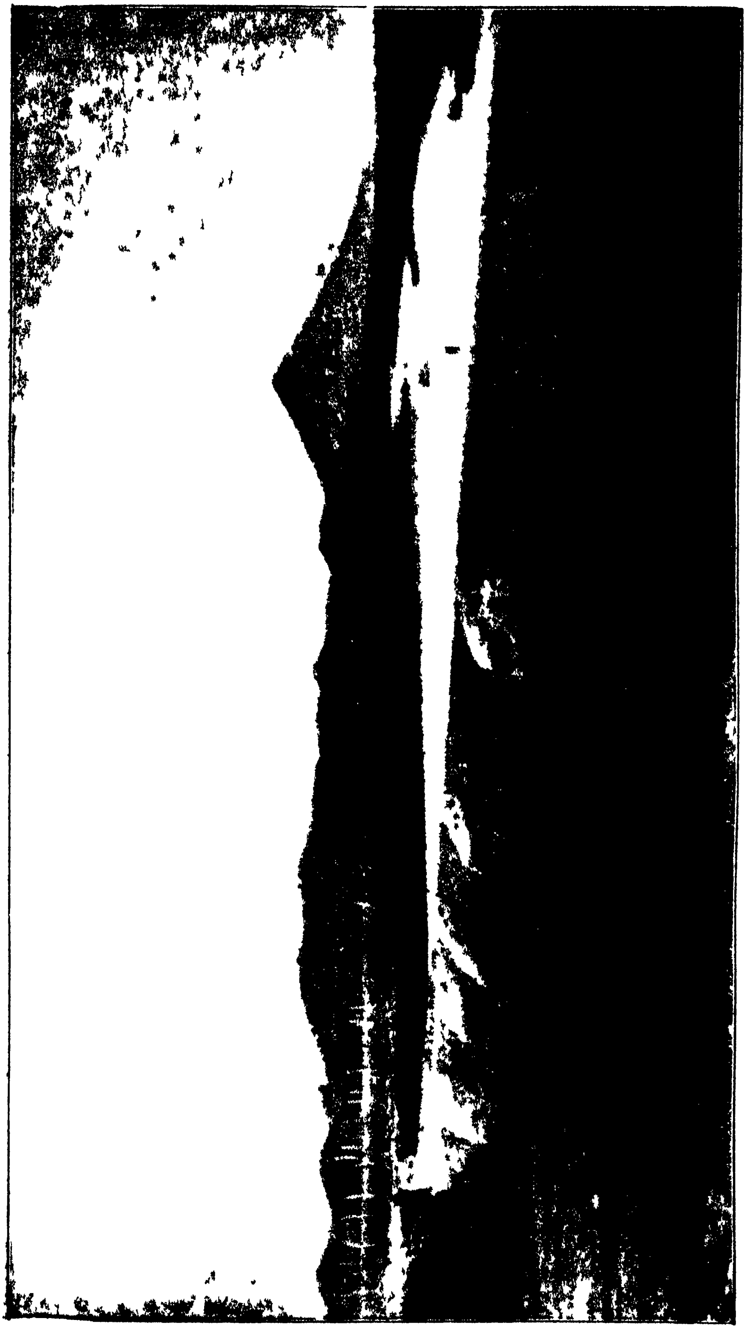
Thoroughbred Mare "Miss Collingwood" with "Leisure Hour" foal, three weeks old.



Thoroughbred Mares in Lucerne Paddock, Zigaga, Normandien, Ormely and Palmira.

Spruit offers too tempting an opportunity to be lightly passed over. It has an extensive drainage area, and seldom or never runs entirely dry, so Mr. Webb has constructed no less than three masonry weirs in the bed of the stream, to divert the flood waters over the lands, and to conserve a certain portion for times of scarcity. One of these is shewn in the illustrations herewith. The water is to be pumped up by means of a twenty-horse power oil motor, which has since been installed, when a large extent of land lying along the banks of that stream will be brought under cultivation—mostly lucerne. This scheme will enhance the value of these farms to a wonderful degree, and enable them to carry treble the quantity of stock they could in their natural condition. It will be a great advantage to have plentiful supplies of lucerne for their thoroughbred stock, particularly for the youngsters, as it should help them to grow out. Another advantage that ought to accrue is the provision of softer pastures than are usually obtainable in this Colony. It is not generally realised how great an advantage this is to young horses, but a soft paddock for them to run in during the earlier years of their existence makes all the difference to both their feet and legs in after life. With good paddocks well cultivated, something should be done towards bringing

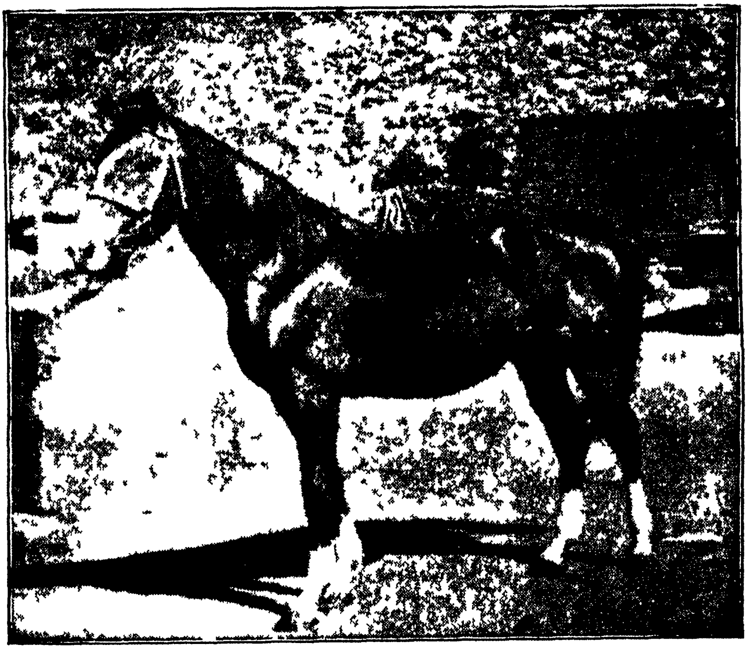
Brood Mares in the veld at Holle River



Masonry Wei Oorlog Spruit at Kleintoren

The Homestead "Colga" Brood Mares and Foals in Kraal.

this advantage to the young thoroughbreds at Holle River. It is the regular use of the cultivator that will do the trick. The full value of that useful implement has yet to be learned in South Africa, though it is coming into more general use every day. Talking of cultivation, I was more than pleased to see one of the staff at Holle River handling a scythe in a most workmanlike manner among the lucerne. That is another tool which is sadly neglected here, probably because its use is not easily learned, and South African farming has not found much scope for it hitherto. But the man who can cut a clean swath through a field of grass or clover, is a handy man where there are animals to feed and a bit of green fodder is wanted.



“Kingfield,” son of “Winkfield’ Thoroughbred Stallion at “Colga’

A Practical Object-Lesson

On these four farms of Mr. Bailey’s, things are beginning to move very fast, and the day is not far distant when they must cause a stir in the cultural circles of the district. Already their influence is being felt, but to nothing like the extent it will be later on. English and Dutch alike are watching with increasing interest the developments that are going on, and it is to be hoped that these will be maintained in the manner in which they are now proceeding, for they are on sound lines of progress. The usual verdict in the case of the rich man who takes to farming in this country, is that of the *“fool and his money,” and mystic conjectures are common as to how* long it will be before he tires of his new toy. But there is nothing of that about the Bailey venture in the Colesberg District. In fact it struck me as the experiment of a hard-headed business man who was determined to do all he could to make it succeed. It may be a disadvantage for such a man to have command of, practically speaking, unlimited capital, but it is one of those disadvantages which few men would really grumble at if their hearts were in their work. At any rate, there is no sign of waste under the present management, for if Mr. Webb were in any other circumstances he could not possibly organise all the work he is doing on a sounder or more practical basis. To give an idea of what is being done on these four farms, I will just summarise a few of the notes I took. The four farms approximate roughly 30,000 acres, most of which is Karoo veld. On this is carried 15,000 sheep, 250 head of cattle, 100 veld mares for breeding, 50 thoroughbred mares, and 6 stallions, as well as the herd of Herefords mentioned before, ostriches, goats, etc. Eighteen boreholes have been sunk, of which fifteen are successful. Seven windmills are erected, and others were *en route* at the time I was there. Twenty miles of new fencing has been put up, and about five miles of jackal-proof netting. Some 5,000 lambs were expected this season. Water-boring has been going on for 14 months, and the must be just perfect for horses and cattle. Dairying, by the way, is

Persian Rams at "Colga."

drill is still at work. There are 200 acres under lucerne, and some 500 more are about to be planted with that crop. There are three masonry weirs in the Oorlog Spruit, and no less than twelve earthen dams on the four properties. This is not a bad record of useful work.

Only one thing seems wanting. The pressing necessity for the conservation of the splendid drought-resisting, edible bushes of the Karoo is patent to all. Here is a magnificent opportunity for organised experiment in this direction. All that is needed is more fencing, and a system of resting the veld in sections.

Thoroughbred Mares and Foals at "Colga"

Mr. L. E. B. Homan's Farm, "Colga."

There is quite a horse-breeding belt just about here, for the adjoining farm to Kleintoren is that of Colga, the property of Mr. L. E. B. Homan, the well-known breeder and sportsman. It is a pretty little place, comfortably situated under the shelter of a bouldery kopje and facing a wide expanse of grazing land that should one day figure larger in the value of the farm—that is, if they succeed in getting water on it as is hoped. The extent of the farm is 2,500 morgen, and it is managed by Mr. S. A. White. This is also worked as a general stock farm, with horse-breeding in the forefront. I saw some excellent Persians and cross-breeds here, and the manager tells me they thrive wonderfully well. The

The Homestead at Vanwyksfontein

buildings are also very substantially constructed, and taken altogether there is an air of comfort and good management about the whole place that appeals to one at once. The gates are all in good order, the place has a cleanly look, and is both bright and attractive. The water supply is being developed, and though nothing very great is being done in the shape of growing crops under irrigation, the supply is ample for all needs. A large dam at the back of the kopje against which the homestead is built gives all the water used on the farm, but plans are afoot for the further development of the waters—both surface and underground. When this comes about there will of a certainty be a great deal more cultivation here. As it is, the "lands" comprise about twenty-five acres of well-established lucerne, and a young orchard with a few trees around the house. The strong feature of the farm is the wide extent of beautiful vlei lands which it contains. In a good season these vleis a feature of the industries of the place, but owing to the continued dry seasons it has not thrived as it should have done. Mr. White has an excellently equipped little dairy and turns out a good deal of butter for the Colesberg market. Another strong point about this property is the ease with which turkeys are reared there. Mrs. White seemed to look upon turkey-raising as no trouble at all, and in proof of her theories showed me some splendid flocks of these fine poultry all in the best of health and condition. It is probably the climate that makes this branch so simple. At any rate it should hold out a promise of profitable poultry-rearing to anyone inclined that way. The farm is only two hours from the main line of railway, with all the large markets of the country lying on either hand.

The only thoroughbred stallion on the farm when I was there was Kingfield, a son of Winkfield. Simonwick, another St. Simon, had been standing there for some time but he had been sent down to Mr. Alec Robertson's and from there on to Mr. H. van Zyl at Hanglip. However, I saw him later on at the latter farm. The class of mare mostly bred from here is the Colonial type, as much as possible on the lines of the old Hantam animal. But it has been so difficult to secure this type of mare since the war, that the old Hantam horse seems to be almost doomed. It is to be hoped that with all the new blood in the district we shall soon have a new Hantam horse with the characteristics of the old one and a few improvements. Soil and climate have a great deal to do with horse-breeding, so that there is no reason to fear that what has been done before cannot be done again. The photographs I took of the stud animals all over this district must be accepted for what they are, just snapshots, for none of the animals were in any sense "got-up" for the occasion. In fact, nearly all of them, particularly the mares and foals, were simply driven in from the veld. Excellent work is being done by Mr. White in the prevention of sluiting.

VANWYKSFONTEIN.

The next property I visited had rather a melancholy interest attached to it, for the old owner was just going out and the new one coming in. Vanwyksfontein lies on the railway line close to Norval's Pont, in fact, the siding, Van Zyl, is on the farm. It was for years the property of the Van Zyls, the last owner being Mr. I. Van Zyl, who had to give it up owing to losses through war and drought. It is a good stock farm but has been tramped out pretty badly and needs a rest before being re-stocked. There is a grand spring of water on it which supplies irrigation waters for a large extent of land and with careful handling it should prove successful under the new management. The house will indicate the style of the former owners. It contains no less than seventeen large, lofty rooms. It is not nicely situated, the road passing quite close to the homestead. There is an excellent old orchard and a vineyard on the property, but both have been sadly neglected. Mr. J. Kirkwood, of Johannesburg, is the new proprietor. His health recently gave way at the Rand and he was ordered to live in the Karoo for a couple of years. Like a wise man he elected to go in for farming, and as it was among his earlier ventures in life he should not be long at picking up the threads again. His father, the late James Kirkwood, of Port Elizabeth, was one of the pioneers of the Eastern Province, and to him is due the inception of the big irrigation scheme at Bayville in the Sundays River Valley. As a matter of fact, he ruined himself in his endeavours to make the scheme a success, and it was there that the present owner of Vanwyksfontein made his first efforts at farming. His lines are cast in different places now, and it is to be hoped that prosperity may attend his enforced return to to the land.

(*To be Continued.*)

CITRUS GROWING IN THE EASTERN PROVINCE.

The following paper by Mr. H. G. Flanagan of Prospect Farm, Komgha, was read at the meeting of the Komgha Farmers' and Fruit-growers' Association, held on September 16th :—

At the request of some of my friends, and others interested in the subject of citrus growing, I have been induced to prepare this short paper, being the results of my observations and experiences of the management of citrus trees in the Komgha district, which I have been actively connected with for a number of years past. The adaptability of this section of the country for the cultivation of the orange cannot be doubted, indeed I question if a finer climate exists anywhere in the world, than this, for the production of citrus fruits. This country, however, possesses a very diversified topography. Even within the distance of a few miles the conditions of soil, temperature, etc., vary so much that what would be a success in one place, may prove a failure in less favoured spots. Still as a whole I hope my remarks, the outcome of practical field work, may prove interesting to those contemplating that most fascinating and remunerative occupation, "citrus growing."

PROFIT OF CITRUS GROWING.

Positively no fruit grown in this country at present yields a larger percentage of profit, nor bears with greater regularity than the citrus, indeed the returns are sometimes fabulous, and even incredible, for a country which can produce fruit of unquestionable quality, and if developed, in unlimited quantities. Owing to the present rate of planting, it is asserted by many that the orange industry will, in the future be overdone, and that there will be no money in the business. The same cry was uttered in California and Florida, when the industry was in its infancy. Look at the position to-day, thousands upon thousands of citrus trees are still being planted in those countries, and still citrus growing is regarded as a sound investment. The fruit from these countries is mostly exported, and surely when we have the quantity we can develop an export trade. At the present time we have barely sufficient to supply our own markets. I admit that at times a glut occurs on our local markets, and prices are discouraging to the grower, but the average price for citrus fruits, I maintain, is good enough for the producer. This is still a young country with a growing population, and large mining centres already established, and with but a limited area on which we can grow the citrus on a commercial basis. I am of opinion that given suitable soil and locality, no occupation offers a more tempting investment to the beginner, than citrus growing. To make a success of this business, as with most others, something more is required than the mere planting of your trees. It is essentially a work of love, of constant care and supervision. You must put your whole heart into your work, tend your trees with the all inspiring love of nature, study their wants, which the careful observer will soon learn to know, keep them free from their numerous foes, particularly the red scale, and I can assure my readers, if they really love the work and occupation as they should, they will make a success of their groves far beyond their expectations, which will not only be a source of gratification to themselves, but also of admiration from their fellow men, and last but all important, will bring within easy reach the coveted dollar, which we all strive to secure a portion of.

PLANTING OF GROVES.

For many years past and even now among a certain section of growers, the idea prevailed that worked, or grafted trees were unsuited to this country, owing chiefly to the trees not attaining any size and being short lived. There is without doubt, a certain amount of truth in this opinion, owing to several well-known causes. Worked trees have been grown on several unsuited stocks and after flourishing a few years deteriorate, and even die out altogether. Another cause which has tended to discourage some planters in the use of worked trees, is, that desiring a quick return from their trees, they purchase established bearing trees in tins, which if potted for any length of time become pot bound, and these, when planted out invariably fail to make healthy and vigorous trees, and for this reason worked trees are regarded with disfavour by some of the less enlightened growers. Personally I should never plant any other, but a worked tree, as I am convinced from my experience they are the most desirable in every way, being quite healthy when on suitable roots, and other conditions favourable, and securing to the planter that most desirable and important object the uniformity in quality of the product, which in a commercial venture means the difference between profit and loss. Seedling trees undoubtedly make larger trees than grafted trees, but you have to wait seven to ten years before you get any return for your outlay and labour, and then when your returns do come in how do we find the produce compare with the products of the named trees, which have been perpetuated by grafting. The seedlings will yield a mixed product, no two trees yielding fruit alike, perhaps some excellent varieties among them, others inferior, but at the harvesting of your crop the value will probably be adjudged by the inferior grades, as a few bad oranges in a sample always lessen the value of the whole. When competition becomes keener this important matter will be brought nearer home to the producer. I cannot impress too strongly upon intending planters the importance of planting only well-known named kinds, varieties which have been selected from the product of the whole world, and which possess a combination of superior qualities, singling them out far away ahead of all others. Named kinds will soon become known in our markets and command the attention of buyers to the neglect of seedling stuff.

STOCKS.

The question of stocks for citrus trees has been a most perplexing and unsatisfactory question to both propagator and buyer in the past. Some years ago the Government experts strongly advocated the use of the Bitter Seville orange as the most satisfactory stock to use, basing their recommendations on the results obtained in other countries, by the use of this stock as a preventive against the dreaded mal-di-goma, or root rot of the orange. The nurserymen in response to the wishes and demands of their customers propagated very extensively on this stock, and disseminated trees all over the country. It was soon observed that the little trees even in the nursery rows were not growing so well as those on more congenial roots, and many of our nurserymen were quick at recognising this fact. Notwithstanding the demand for Seville-rooted trees was great, and to my personal knowledge, many planters invested their money in this root with most discouraging and disappointing results. Not only was their money thrown away, but all their patient waiting and labour was in vain. In no instance under my observation can I conscientiously say the Seville root has been a success, although a few varieties of oranges will drag out an existence on this root, but never make thrifty and profitable trees. The dissemination of this stock throughout the country a few years back gave a decided check to the citrus industry from which it is only just recovering, and planters recognising the primary importance of stocks, plant with greater confidence now since certain stocks have proved a success, and can be obtained from the leading nurserymen. From my own practical work, both in grafting and growing citrus trees, I claim I can write with some certainty as to the behaviour of certain stock, and the various results obtained. For all varieties of the citrus, and to secure the best and most uniform results, I have no hesitation in recommending before all others the sweet seedling and the rough lemon stocks. The sweet seedling cannot be excelled in vigour and health, providing other conditions are favourable. It has unfortunately a great drawback to its general adoption, and that is its susceptibility to the mal-di-goma. The rough lemon stock produces a rapid growth in the young trees, and produces fruit of excellent quality, lemons being practically proof against the dreaded mal-di-goma. It is capable of withstanding drought to a remarkable extent, in fact it has become naturalised in a few localities in the woods of our district, thriving successfully side by side with our hardy indigenous trees without any cultivation or attention whatsoever. This is a very strong point in its favour as a stock, and for its general adoption for this purpose. In my opinion this stock stands ahead of all others for this country, so far as our present knowledge goes. The pampelmous I have used rather extensively as a stock, but find some varieties unsuited to it, and the results not always uniform even in the same variety. In future it will be discarded for my own planting. The trifoliata, or dwarfing hardy stock has not been sufficiently tested yet to offer an opinion as to its merits or otherwise.

SELECTING A LOCATION FOR AN ORANGE GROVE.

In selecting a site for a grove, special reference should be made to drainage, soil, irrigation facilities, and shelter. It is highly essential that the locality be thoroughly drained. In no case should, stagnant water come into contact with the roots. The citrus tree loves moisture, but the soil should be such that the surplus water drains off rapidly. The citrus will thrive in a variety of soils, but for preference I prefer a reddish or black loam of considerable depth. Where one has the choice, there is no locality more suited to the purpose than old forest land, for there the conditions have been tested and proved adapted to tree growth, and the orange can with absolute confidence be planted there. I should hesitate to plant extensively without irrigation facilities at my command. There are certain periods when irrigation is absolutely necessary to bring your fruit to a marketable size, and the young fruit to set. Water, however, must be applied with considerable discretion, as I am convinced the abuse of water, with a retentive subsoil, has been the death of many fine old groves of orange trees in this country. It is a common rule in many parts of this country when irrigating trees to form great basins around the collar of the tree and to run the water into this. No system of irrigation could be more illogical than this, not only does it encourage mal-di-goma, but is is of very little use to the trees as the feeding roots are yards away from the trunk of the tree, and it is these little rootlets which should be supplied with food and water to maintain the tree in vigour and health. The best system of irrigation to adopt is the furrow system, that is to have two or more furrows between your rows of trees, and allow the water to run down these and soak in. The furrows should be of a good depth, to allow the water to get well down to the roots. Mere surface irrigation is not recommended, as it tends to attract the feeding roots to the surface, where they are more easily influenced by temporary droughts. Immediately all the water has soaked into the ground, the furrows should be covered in again with dry earth to prevent evaporation. Irrigate only when absolutely necessary, and never allow the water to run longer than to soak the ground.

SHELTER

is another important matter to consider, in relation to your location for a grove. Shelter belts of trees can be easily planted and many desirable open spots converted into flourishing groves by this means. For this purpose it will be necessary to have evergreen trees for wind breaks. The citrus grove being more in need of protection from the cold winds prevailing, during the winter months, when the trees are carrying fruit and coming into flower, and when deciduous trees would be bare of leaves. The *cupressus macrocarpa* makes an excellent winter shelter line, but beyond this I should recommend planting a belt of tall trees, such as the blue gum. Care, however, must be taken to allow plenty of room for root expansion of any evergreen trees planted, as they are continually robbing the soil of its water contents, and if planted near your trees will certainly prove a disadvantage to their development. I should not plant bluegums nearer than 30 yards away from any fruit tree. It will, however, be observed that the finest oranges and largest trees are those found growing in the deep valleys and gorges of our undulating country, well protected either by natural forest, or prominent eminences. A southern exposure should be chosen for preference, where the climate is modified and rendered milder by the ocean's influences.

TRANSPLANTING.

The utmost care is required in the transplanting of the young citrus trees from the nursery to the grove. Presuming them to be well packed by the nurseryman and arriving at their destination in good condition, the trees should be carefully removed from the packing, and transferred to shade at once, and kept covered with damp bags or wet moss. As the planting proceeds, a few trees only should be taken from under the covering at a time, and even these should be kept wrapped up in a wet sack until set. Should the ground be dry, water should be immediately applied to the planted tree. The roots of the citrus family are very delicate indeed, and should on no account be allowed to become dry, as when once dry they have not the power of recovering. I find it an excellent plan to puddle the roots in thick muck immediately they are dug from the ground, or taken from the packing, should they come from a distance. If the trees are nice and fresh, and treated thus, they will scarcely feel the shift. Presuming the ground to have been previously prepared for the reception of trees, the operation of digging the holes can be better done at the time of setting, two sets of two boys each being sufficient to keep one setter busy. The holes should not be dug too deep, and sufficiently wide to allow the roots being spread out evenly, without being doubled up. Many planters make a grave error in digging deep holes and planting their trees the correct depth, as they think, but after the earth has settled, the trees are often six inches or more too deep, which is fatal to the well-being of the tree. I cannot impress upon intending planters too strongly the importance of shallow setting of the trees. I firmly believe deep setting of the orange is one of the chief causes of disease. The roots around the collar of the trees should always be exposed for a few inches to the sun and air, and under these conditions they will soon thicken and form strong braces to the tree, imparting vigour and life to the branches. After the trees have been set, and the holes filled up with fine earth, particularly about the roots, water should be applied to the trees without delay, each tree getting a thorough soaking. After the water has soaked in, a mulch of fine earth should be spread over the hole and around the tree to prevent evaporation, and keep the ground cool and moist. Should it be necessary to repeat the watering, after an interval of a week or ten days, remove the mulch while watering, and replace again as in the first watering. If the trees are suffering much from transplanting, do not hesitate to cut them back and reduce the top, and if the weather be hot give the trees some protection from the sun. A good distance to plant grafted trees is 24 (twenty-four) feet apart each way. Being early and prolific bearers, they never attain the same size as seedlings, but assume a more spreading habit of growth. Although the orange will survive much neglect and exist for years without any attention, the subject of

Thorough Cultivation

is a very important factor in maintaining your groves in vigour and health, and as a result increased production. The ground between your trees should be ploughed at least once a year, preferably in the autumn after the rains have ceased, and after this, frequent stirring by means of a horse-hoe, or some such implement. In the ploughing of the ground it should always be the aim of the operator to keep the ground as level as possible, and avoid ridging and furrows. If the grove should be located on sloping ground, care should be taken that drains are so constructed, that in the event of a sudden precipitation of rain, the surplus water can be carried off down these, and avoid the surface mulch from being washed away. To facilitate this object at each ploughing, the furrows should be reversed. By cultivating deep and thoroughly, much less irrigation water is needed, and by the admission of air to the roots the trees remain healthy and free of disease. The orange is as a rule, not subjected to much pruning, except the cutting out of all interior growth, which has ceased to carry fruit by being choked out by the expanding growth of the tree. In California the lemon tree is now pruned to a large extent, and it is claimed that it is a great improvement, the product is superior, and the yield larger. The chief aim in pruning the lemon is to induce a spreading lateral expansion, and cut all the centre and upright growth away. Constant watchfulness is needed to keep the upright growth in check, reduce the non-bearing wood on the main branches to the smaller growths, which induce fruit spurs to form. By this system of pruning trees, they form a dense canopy of leaves which protects the fruit from the sun, and the fruit is carried more on the stout limbs of the tree. The objection to this method, however, is that it entails a great deal of hand labour to keep the ground under the trees cultivated as with the low spreading growth it is impossible to get near the trunk of the trees with the horse-cultivator or plough.

Varieties to Plant.

Although there are many excellent varieties of oranges, lemons and mandarins, etc., cultivated and obtainable in this country for commercial purposes and with a view of exporting in the near future, only the most suitable in each class should be planted. For this purpose in oranges the Bahia or Washington navel ranks first, and in its season, which extends through the greater portion of our orange season, has no competition. Its superior flavour, size, bearing qualities, etc., rank it before all others, and it has been appropriately called the "King" orange. Owing to the reputation it had in Florida as to its shy bearing habit, I thought it just possible it might develop the same habit here as is the case with the Cape navel, but after fruiting it for several years, I can with confidence recommend it before all other varieties for planting. It is certainly not such a heavy bearer as some varieties, which is a decided advantage, as you get a more uniform and higher grade of fruit. The Valentia late comes next in rank of importance, following the Bahia in its season of maturing, and being an excellent keeping orange of fair size and solid flesh if left on the trees it will hang right through the summer. It is an excellent bearer and healthy grower. We have some excellent varieties of Cape naartjes, which command high prices on our markets. There are also some fine imported mandarins, such as Satsuma, Dancy, and Emperor, etc. For commercial purposes, however, the naartje and mandarin, cannot rank with the orange and lemon in importance.

LEMON CULTURE

does not appear to have received much attention from citrus growers generally up to the present time, simply from the fact that most growers do not recognise the fact that the commercial lemon is a very different and superior product to the ordinary rough or colonial lemon, which as a rule has not a very high market value. The commercial lemon has exceptional keeping qualities, yielding fruit under favourable conditions, all the year round, abounding in juice and rich in citric acid. From my experience in lemon growing, I have no hesitation in saying that the conditions prevailing in the more sheltered parts of this district, are exceptionally favourable for the production of a fruit of very superior quality. The lemon is more tender and susceptible to cold than the orange, and the area for its successful culture is necessarily more restricted. In varieties, the Lisbon and Villa Franca, constitute all the qualities that can be desired in a first-class lemon. The Lisbon is not such an early bearer as some varieties, but the tree which is thorny when young attains a large size and when full-grown produces large and regular crops. The Villa Franca is practically thornless, the tree, dwarfish, an early and prolific bearer, the fruit being more rounded than the Lisbon, in every respect a first-class fruit.

CO-OPERATION IN AGRICULTURE.

The following circular has been sent to the secretaries of all Colonial farmers' and fruit-growers' associations and agricultural societies:—

Office of the Director of Agriculture.
Cape Town, October, 9, 1905.

AGRICULTURAL CO-OPERATION IN THE CAPE COLONY.

Dear Sir,—I am directed by the Secretary for Agriculture to call your attention to the fact that vigorous efforts are now being made to bring the advantages of co-operation in agricultural production within reach of every district in this colony. A number of meetings have already been held, and the greatest interest has been shewn in the proposals submitted to them by farmers representative of all shades of opinion.

The direction in which co-operation might be applied may be indicated as follows:—

(*a*) Societies for the sale of grain, wool, mohair, etc., with more highly organised supervision and access to the best markets.

(*b*) The purchase of seeds, manures, implements, etc., of the highest quality at wholesale prices.

(*c*) The introduction of combination among farmers, especially the poorer farmers, for the establishment of agricultural credit societies to enable them to procure loans under more favourable conditions

(*d*) The establishment of creameries for the increased production of uniform butter with the aid of up-to-date machinery, and to effect its sale in a remunerative way.

(*e*) The improvement of poultry, egg, and other incidental farming industries, which although commonly regarded as of little importance, are an immense source of profit if dealt with on co-operative lines.

(*f*) Experimental work of various kinds in order to prove to farmers the best methods by which agriculture may be carried on in their respective districts.

(*g*) Improvement of live-stock through the medium of associations and the joint use of agricultural machinery of an expensive character.

Mr. Fuller will take it as a great favour if you will communicate with him as early as possible, stating whether your association will join him in the work in which he is engaged and inform him in what way the principle of co-operation may be most effectively applied.—Yours truly,

P. J. HANNON.

MR. HANNON'S ADVICE.

A Co-operative Circular.

The following circular letter, addressed to the farmers of the Cape Colony, has been written by Mr. P. J. Hannon, and issued by the Agricultural D partment :—

The most striking change in the agriculture of European countries and British colonies during the past twenty-five years has been the universal introduction of the co-operative principle. In countries like Denmark, Germany, Holland, Belgium, France, and Ireland, where, from time to time, farmers were face to face with the greatest difficulties, the farming industry has not merely been saved from ruin, but has been put upon a basis of permanent prosperity by the formation of various kinds of co-operative societies. It is but too well known that the splendid position which Denmark occupies in the markets of the world with its butter, bacon, eggs, and other agricultural produce, is wholly the result of combination amongst farmers. The agricultural exports of that country to England alone amount to £16,000,000 per annum. In Holland, where as late as ten years ago the production of butter, cheese, and pork, and the organised sale of these and other products were practically unknown, upwards of £6,000,000 worth of agricultural products were sold during the past twelve months to England. In Belgium every branch of the agricultural industry has been brought under the influence of self-help associations, and in Ireland, which is entirely dependent upon its agriculture, the position of the farmer has been raised from poverty to comparative independence through the spread of co-operation.

Ireland's Success.

In 1889, owing to foreign competition, the successful sale of Irish produce in British markets had been practically destroyed, and Irish farmers found themselves in a most hopeless condition. At that time, however, Sir Horace Plunkett commenced his co-operative teaching, and, in spite of great difficulties, he succeeded in bringing all classes and political parties to work together, and the Irish farmer entered upon a new career of prosperity.

At the close of 1904, after fifteen years'. successful work, there were 905 societies in existence in Ireland, with a membership of 107,000 farmers, and sales of dairy and other farm produce exceeding £2,000,000 sterling.

These are facts which may be verified by the farmers in this colony for themselves by reference to the reports which various South African visitors have brought home of what they have seen in European countries.

In Cape Colony our farmers are confronted by the reflection that in spite of our enormous agricultural and industrial possibilities, the home production of the country is unable to feed its own population. For example, the value of butter imported for the half-year ended the 30th June, 1904, was £124,000, or, roughly speaking, £250,000 per annum. The imports of cheese for the same period exceeded £50,000, or over £100,000 per annum. In the same half-year, the imports of flour, maize, oats, and wheat, exceeded £810,000, or, approximately, £1,620,000 per annum. The importation of meat exceeded £1,000,000 sterling, and there were many other imports of lesser amount, nearly all of which, climatic and other difficulties notwithstanding, might be produced within the Colony itself.

The practical question which the Colonial farmer must put to himself at the moment is: "How can this deplorable state of affairs be remedied?" The answer would appear to be by uniting with his fellow-farmers in well-organised groups, bringing their skill, intelligence, energy, and capital into play, in order to enlarge production, facilitate transit, and organise their markets.

For the purposes of general consideration, the following types of co-operative society may be suggested as possible in the various districts:

CO-OPERATIVE CREDIT SOCIETIES,

which enable farmers, especially the poorer farmers, who are often obliged to borrow money in an inconvenient way, to provide themselves with capital at suitable times and under the most favourable conditions. These credit societies will help farmers to hold over produce for better markets, to provide themselves with live-stock, seed, manures, or other farm requirements, and generally for useful purposes on their lands.

CO-OPERATIVE AGRICULTURAL SOCIETIES.

These will provide farmers with their agricultural requirements, seeds, manures, food-stuffs, implements, etc., at a fair price and with a guarantee of quality. They will also carry out experiments in connection with the Department of Agriculture, help materially in improving live-stock in their localities, and encourage more up-to-date methods in every branch of agriculture. Such societies may also undertake, in favourable circumstances, grading, classification, and sale of wool, mohair, ostrich feathers, or other products on behalf of their members, and will in every case arrange for the distribution of information amongst farmers with reference to markets, conditions affecting prices, new inventions or improvements of any kind, and so forth.

CREAMERIES.

In many parts of the Colony milch cows could profitably be kept if uniformity could be introduced in the manufacture of butter, and a profitable means be found for disposing of it. The creamery society is made up of farmers who keep cows, their cream being brought to a common centre, where up-to-date machinery is provided, and where, with proper management, a first-class article is produced, and sent in the best condition to a remunerative market.

Co-Operative Wine Societies.

This kind of society is, no doubt, possible in wine-growing districts, but its organisation must be undertaken with very great care, as it involves the investment of considerable capital. The greatest caution will be necessary in the suggestion of only such schemes as are perfectly sound and practical.

Co-Operative Fruit Associations.

These may undertake the establishment of depots at convenient centres in fruit-growing districts to which fruit may be taken, properly selected, classified, packed, and put on sale in the most highly organised and attractive way. Such fruit depots to be equipped with cold storage, in order to keep fruit in perfect condition for better markets. Such associations may also assist the Department of Agriculture in bringing instruction in better methods of fruit-culture within reach of farmers. It is to be hoped that in most instances fruit depots may be established in connection with creameries, so that there may be greater economy in working expenses.

Co-Operative Grain Societies.

In many districts, owing to various causes, farmers complain of the difficulty in marketing corn at a reasonable profit. It has been urged that societies should provide themselves, at the nearest railway stations, with stores where corn may be collected, sent in bulk lots to the best buyers, and occasionally held over at times of depression until there be an increase in price. This kind of co-operation will receive careful attention, and farmers are requested in the grain-growing districts to at once consult with one another and submit their own views on the subject of what they conceive to be best for their own interests.

It must be clearly understood that the position of the Government with respect to agricultural organisation is purely educational, and the people must realise that the success of the movement depends absolutely upon themselves. The Government, understanding the difficult financial conditions of many farming communities in the Colony, are prepared, provided they are satisfied that the people are determined to help themselves, to make loans to co-operative societies on certain clearly-defined terms, to enable them to begin work in the most businesslike way. These loans are, however, contingent upon the earnestness and public spirit of districts applying for them being shewn in the most convincing way. Such loans will be available for creameries, credit societies, fruit-growers' associations, and wineries, and will be advanced in accordance with rules approved of by the Treasury. All proposals with reference to them must clearly set forth the nature of the projected society and its possibilities of success.

Separate leaflets will be issued on the different kinds of societies referred to above; the object of this being to give, in outline, a rough sketch of the nature of co-operation in agriculture and its suggested application to the farming industry of Cape Colony.

All information with reference to co-operation, the formation of societies, and the advance of loans will be immediately available on application to the Department of Agriculture.

AGRICULTURAL SHOWS IN 1906.

The following dates have been fixed for the 1906 Agricultural Shows:—

Paarl, at Paarl, Thursday, January 25.

Stellenbosch, at Stellenbosch, Thursday, February 1.

Swellendam, at Swellendam, Wednesday, February 7.

Robertson and Montague, at Robertson, Friday, February 9.

Worcester, at Worcester, Monday, February 12.

Ceres, at Ceres, Thursday, February 21.

Malmesbury, at Malmesbury, Wednesday, February 21.

Queenstown, at Queenstown, about last week in February.

Western Province, at Rosebank, Tuesday, Wednesday and Thursday, February 27 and 28, and March 1.

King William's Town, at King William's Town, Thursday and Friday, March 1 and 2.

East London, at East London, Wednesday and Thursday, March 7 and 8.

Oudtshoorn, at Oudtshoorn, Wednesday and Thursday, March 21 and 22.

Albany, at Grahamstown, about the last week in March.

Port Elizabeth, at Port Elizabeth, Wednesday, Thursday and Friday, April 4, 5 and 6.

SEEDS FOR DISTRIBUTION.

With regard to the distribution of seeds to farmers by the Department of Agriculture, mention of which has been made in previous numbers of this *Journal*, wide advantage is being taken of the opportunity by farmers, and in view of this fact the Department is now importing large quantities of seeds for further distribution.

Applications for supplies should be made direct to the Agricultural Assistant, Department of Agriculture, Cape Town, from whom any of the following seeds may be obtained free of charge delivered at the nearest railway station, on condition that a report is furnished as to the success or otherwise of the trials.

Egyptian Clover
Japan Clover.
Crimson Clover.
Red Clover.
Alsyke Clover.
White Clover.
Giant White Clover.
Sunflower, Tall Russian.
White Mustard.
Sulla, Spanish.
Sulla, African.
Soja Bean.
Millet, Giant
  „ Pearl.
  „ Japan Barnyard.
  „ Hungarian.
Mealies, Snowwhite Dent.
  „ Pedrick Perfected Gold Beauty.
  „ Leaming Improved.
  „ Thoroughbred White Flint.
  „ Wisconsin White Dent.
  „ Cinquantino.
Sugar Beet.
Chewing's Fescue Grass.
Cotton "Sea Island."
  „ "Mitafifi."
  "Rattler."
Perennial Rye Grass.
Italian Rye Grass.
Wheat, "Jonathan."
  „ "Darling."
Wheat, "Gluyas's Early."
Lupins, White.
  „ Blue.
  „ Yellow.
Sainfoin Giant Milled.
  „ Common Milled.
Serradella.
Flax, Riga
Thousand Headed Kale.
Awnless Brome Grass.
Schræder's Brome Grass.
Chicory (Witloef)
Velvet Bean.
Spring Vetches.
Winter Vetches.
Mangold.
Rape, Broad-leaved Essex.
  „ Summer Colza.
  „ Winter Colza.
Cowpeas Black Eye.
  „ Green.
  „ Large Lady.
  „ Brown Eye.
  „ Calico.
  „ Sugar Crowder.
  „ Gourd.
  „ Coffee.
  „ New Era.
Buckwheat.
Timothy Grass,
Cocksfoot Grass.
Smooth Meadow Grass (*Poa pratensis.*)

All seeds which are not actually in stock at present are under order and are expected to arrive in the Colony very shortly. Applications for such seeds will be carefully noted, and supplies despatched as soon as possible after the arrival thereof.

CATTLE DIP IMPROVEMENTS.

Mr. C. Storey, who has had charge of the Dipping Experiments for the Veterinary branch, submits the following notes on the sketches of Dipping Tank Improvements herewith:—

Figure 1 shews a longitudinal section of the tank. The race may with advantage be flagged or laid with stones to prevent as far as possible gravel and dirt from being carried into the tank. The width of the race should not be greater than that of the tank, so that cattle will not readily turn round in it. The entrance of the tank to have a gentle fall—1 foot in 9 feet—sufficient to return the backwash without inconveniencing an animal about to plunge. Three small steps not more than 2 inches in height and 15 inches in width, one behind the other from the offtake are recommended to prevent backslipping and possible injury. The drop at the offtake to be perpendicular, to ensure every animal going over the head, and so enable the dip to reach the ticks within the ears. The outslope, which need not have a rise of less than 1 in 3, should have easy steps—say 5 inch step and 15 inch tread. Ratchet steps, 9 inches (fig. 2) between each, or simply large gravel well grouted in cement (fig. b) also make a very efficient and easy foothold.

The *Draining Passage* continuing from the outslope should have a length of about 80 feet, and may be of the same width as the tank. A draining passage is preferable in every way to a draining kraal. The cattle walk straight out into the drying kraal; they are thus not detained to molest one another in a cramped enclosure, and the returning dip being free from all dung and urine, the tank is not unduly fouled, and the dip will remain pure for a much longer time. The passage may have a gate at the end to detain any animals when necessary.

The pulley block and tackle (figure 3) is strongly recommended where it is necessary to force animals into the tank; it is a saving of time and labour in addition to rough usage with the cattle. A 50 feet rope made fast to a ring in the central beam over the tank, carries the block, the other end being free for hauling. To the hook on the block is attached a 7 foot 6 inch rope, at the end of which is an L shaped catch. Two feet 6 inches from the end the rope is spliced round a 2 inch iron ring, which holds the catch when the rope is placed round the horns of an animal. The catch is then held in position till the rope is taut, where it will remain only so long as the strain lasts.

In the sectional diagram is also shewn the suggested method by which the tanks can be covered in when not in use.

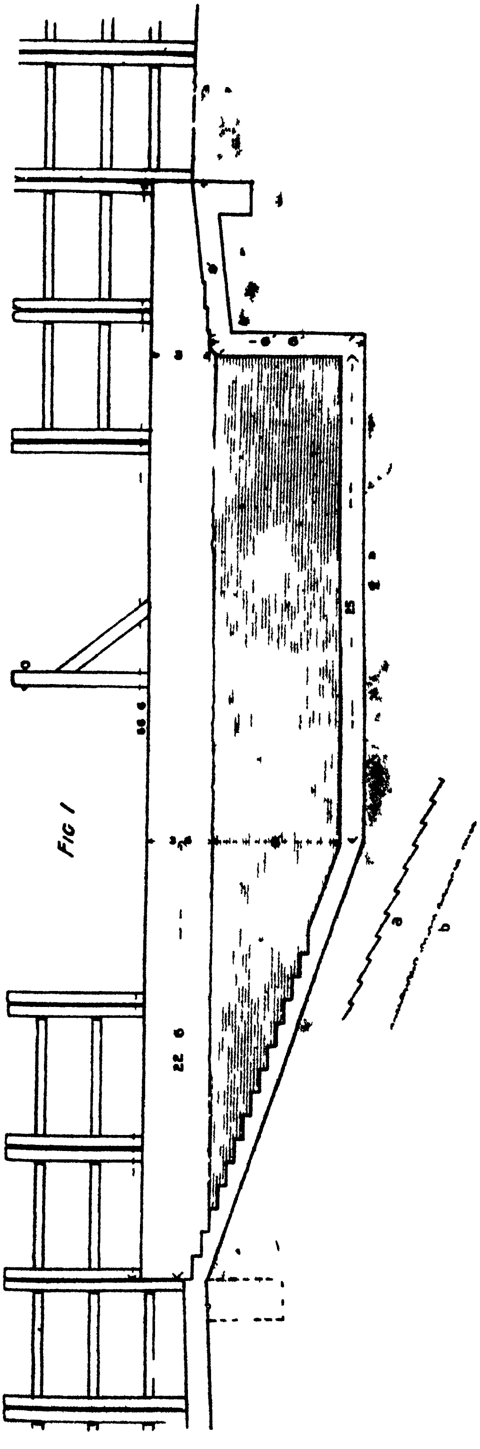


FIG 1

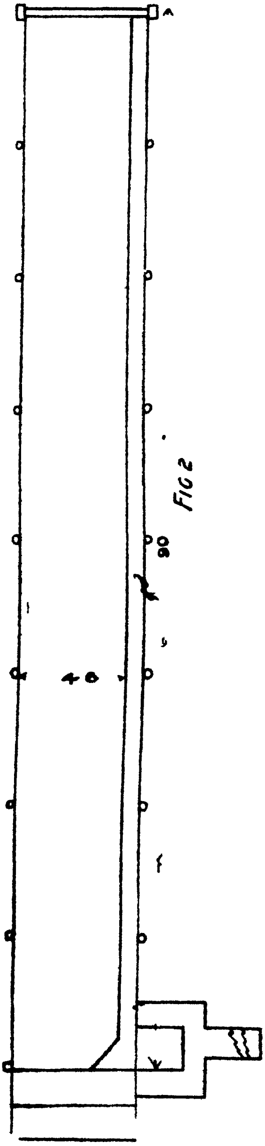
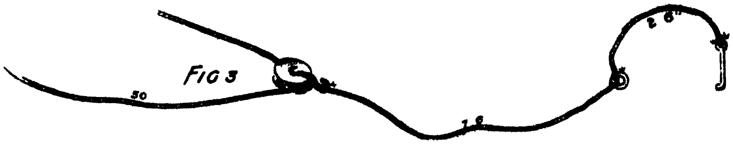
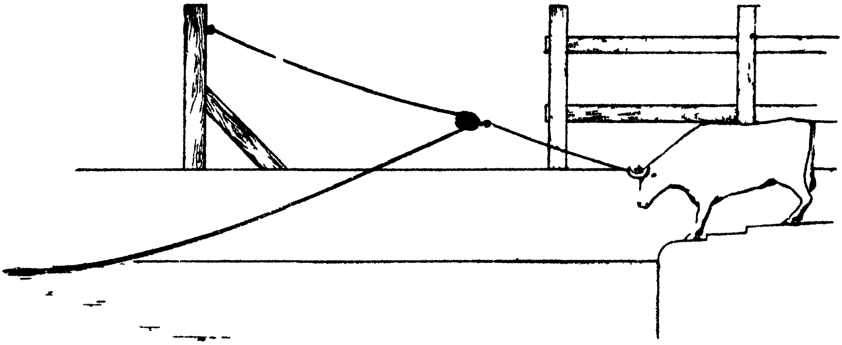
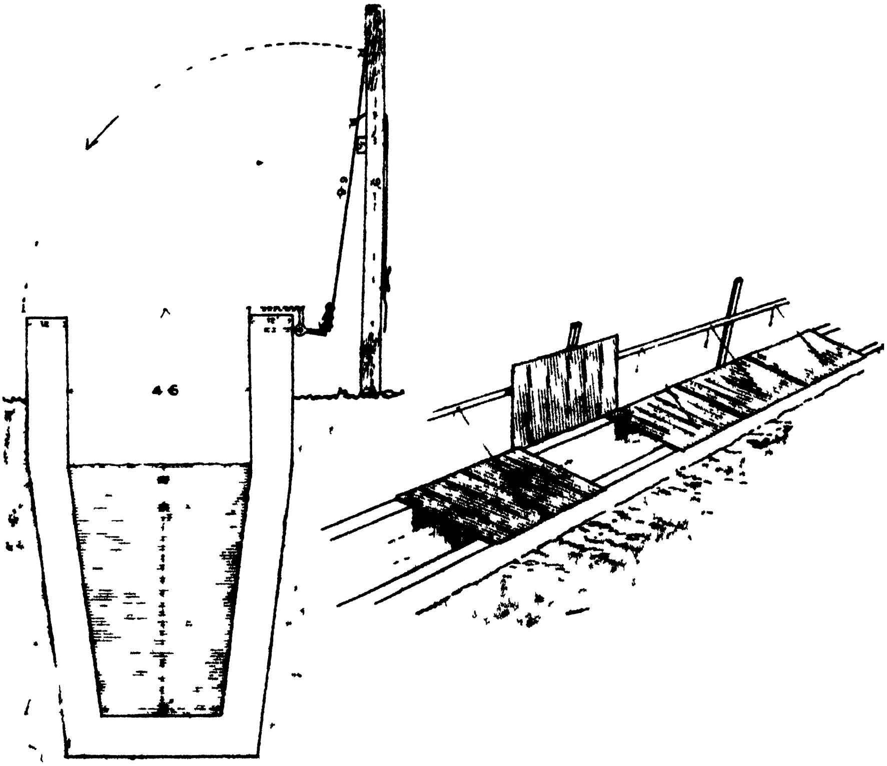


FIG 2

FIG 3







WINE SHOW AT PAARL.

The Annual Wine Show was held this year at Paarl on the 19th ultimo, under the auspices of the Western Province Board of Horticulture. The number of entries exceeded that of last year and it is gratifying to note that the judges consider that the quality of the wines was superior to that of previous shows and the display highly satisfactory.

The judges were of opinion that this year's arrangements in giving prizes for types of wine only should be discontinued, and prizes be offered, as in former years, for wines made from the different varieties of grapes. At the same time they recommended additional prizes for types under the following classes, in which mixed wines would compete: One class for Hock (dry light wine), one class for Sherry (dry heavy wine), one class for Claret (light wine) one class for Burgundy (heavy wine).

In respect of the prizes offered for Dop brandy, the judges recommended that in future no prizes be offered for that class, but strongly advocated prizes for the better type of wine brandy.

The judges, Professor Dr. P. D. Hahn, Messrs. F. Kuffner, Fanner (of Messrs. Collison and Co.), F. Green, jun., H. Gird (of Messrs. Van Ryn and Co.), F. Yon (Groot Drakenstein), T. de Kock (late of the Paarl Brandy Co.), and A. de Villiers, must have had an arduous task in coming to a decision in some cases.

It is to be regretted that, owing to the exceedingly stormy weather prevailing at the time, no wine farmers from the neighbourhood attended the Show.

The following is the Prize List:

Best ten leaguers wine of the hock type (light white wines) (21 entries): First prize, W. A. Krige, Stellenbosch; second prize, J. F. du Toit, Vlottenberg; third prize Louw Bros., Vlottenberg.

Best ten leaguers wine of Sauterne type (white wines between hock and sherry type) (20 entries): First prize, W. A. Krige, Stellenbosch; second prize, Roux Bros. Vlottenberg third prize, H. F. Foster, Welmoed, Lyndoch.

Best ten leaguers of sherry type (heavy white wines) (20 entries) First prize, Roux Bros. Vlottenberg; second prize T. de Waal third prize, H. J. Joubert.

Best five leaguers sweetish white wines (Madeira type) (3 entries) No prize awarded.

Best five leaguers sweet white wines (5 entries): First prize, P. and P. Rabie, Over Hex River; second prize, D. de Vos Rabie, M.L.A., Over Hex River.

Best ten leaguers wine of the claret type (light red wines) (21 entries): First prize, High Constantia Estate: second prize

C. W. H. Kohler, M.L.C., Riverside, Paarl; third prize, N. Myburgh, Eerste River.

High Constantia Estate was originally awarded also the third prize, but competitors being allowed only one prize according to the rules, the next best wine was awarded the third prize.

Best ten leaguers wine of the Burgundy type (full-bodied wines), 17 entries: First prize, J. A. Brink, Constantia; second prize, A. B. de Villiers, Stellenbosch: third prize, H. A. Blignaut, Achter Paarl.

The third prize was originally awarded to A. B. de Villiers, but according to the above-mentioned rule, the next best wine obtained third prize.

Best five leaguers heavy dry red wine (port type), four entries: First prize, P. and P. Rabie, Over Hex River. No second and third prizes were given.

Best five leaguers heavy sweetish red wine (sweet port type), six entries: First prize, D. J. de Wet, Ashton; second prize, A. P. Burger, Nuy; third prize, J. J. le Roux, Paarl.

Best five leaguers sweet red wines, five entries: First prize, P. and P. Rabie, over Hex River; second prizes, J. J. le Roux, Paarl. No third prize was awarded.

Best two leaguers wine brandy: No entries.

Best two leaguers Dop brandy, 10 entries: First prize, J. J. le le Roux, Paarl; second prize, James Malan, Constantia; third prize, J. D. Krige, Stellenbosch.

Best half-aum Van der Hum: No entries.

Best ten leaguers light white wines, 22 entries: J. F. du Toit, Vlottenberg, won the silver cup, presented by Mr. J. W. Jagger, M.L.A.

Best ten leaguers light red wines, 17 entries: J. A. Brink, Constantia, was awarded the silver cup, presented by Mr. Jagger, M.L.A.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome.

Questions are also invited. In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month. Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible.

All letters or contributions should be plainly addressed: "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown;" they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication.

Disinfecting Kraals, &c.

To the Editor, Agricultural Journal.

Sir,—I should be glad if you could let me know what is the cheapest scab destroyer for disinfecting kraals and out houses (not for use on the sheep)

Also if ferrets have ever been successfully used for driving spring hares from their colonies and then catching by dogs.

"Acari."

Any of the carbolic or arsenical dips can be used for disinfecting kraals. Probably the cheapest and most effective would be arsenite of soda, better known as scrub exterminator.

There is no reason why ferrets should not be successfully used against spring hares if properly handled, but we have no experience of them at this work.

Veterinary Assistance.

To the Editor, Agricultural Journal.

Sir,—I have noticed in the Departmental Notices in your *Journal* that applicants for the services of Government Veterinary Surgeons are advised (in many cases) to telegraph to the Chief Veterinary Officer, Cape Town, the nature of the complaint the animal is suffering from, giving as full and accurate a description of the symptoms as possible. I would suggest that the Chief Veterinary Officer be asked to formulate a table of

I. Questions *re* the Nature of Diseases.

II. Questions in Regard to Causes.

And that such a table be printed and enclosed in each copy of the *Journal*, so as to serve as a guide to farmers. The following tables are used in another country. If you think that they would assist the farmer I would be glad if you would carry out my suggestion and have such a table printed.

QUESTIONS *re* THE NATURE OF DISEASES.

I.—State the class or breed, also age and sex, and date of attack.

II.—What was the general condition of the animal before, and at the commencement of the attack.

III.—Note the general condition of the animal whether constantly standing or frequently lying down, and the different positions assumed when down or standing, and whether there is any peculiarity in the movement when walking.

IV. The state of the appetite, whether all kinds of food are refused or partiality is shewn for some particular diet.

V.—Ascertain the temperature of the body and extremities, also internal temperature two or three times daily

VI.—The state of the bowels as shewn by evacuations and whether pain or difficulty is experienced.

VII.—What is the character of the urine, and whether it exceeds or is less than the usual quantity.

VIII—How many times does the animal respire when at rest?

IX.—What is the character of the pulse and how many times does it beat per minute.

X.—Note the colour of the mucous membrane lining of the eye-lids, mouth and nostrils and the colour of the discharge (if any)

XI.—Note all the variations in symptoms and general conduct of the animal throughout the different stages of the disease

QUESTIONS IN REGARD TO CAUSES.

I.—State the character of the herbage or other food the animal has been living on.

II.—What is the nature of the water supply?

III.—What is the character of the locality?

IV.—Has the disease existed in the same breed of animals, or in the locality, before

V.—Is the complaint prevalent at certain seasons of the year? If so, state when.

VI.—If a spreading disease, trace out its origin, if possible, and the means of communication—Yours, etc,

REG.

Anyone qualified to answer the above questions would scarcely need the help of a Veterinary Surgeon. And some of the questions are hardly necessary However, we thank our correspondent for his suggestion, which may prove helpful to some But we must remind our readers that the symptoms asked for in the notice in question are *to be telegraphed*, so that *first aid* help may be given

Lime and Sulphur Dip.

To the Editor, AGRICULTURAL JOURNAL.

Now that the controversy of Cooper's Dip *vs.* Lime and Sulphur seems to have spent itself, I beg to put in a few words. I have been greatly interested in this discussion in the *Agricultural Journal*, as I am always open to conviction, where the progress of Colonial farming is concerned. The question has repeatedly suggested itself to me—"What can be done to make scab legislation less distasteful to those of my fellow-farmers who still oppose the Scab Act tooth and nail. Those who believe scab cannot be eradicated are fairly distributed all over the Colony, and thus far the results of the Scab Act, which in the past has entailed the expenditure of enormous amounts, assist the anti scab community, inasmuch as hardly an area can conscientiously be declared "free from scab." Would it not be worth the Government's while to take a tract of country where scab is now rampant, and make a determined attempt to clear it of scab and so prove to the unbeliever that the cry "Unclean! unclean!" cannot be tolerated, for the simple reason that such a cry is wholly unnecessary.

With a view to testing this suggestion, say the Government proclaim the area stretching from Cape Agulhas to the Langeberg Range, a tract of country where the eradication of scab is beset with all sorts of difficulties, but which, according to my humble idea, gives a splendid opportunity to prove to the most sceptical that *scab can be eradicated*, if only the determination is there to do it.

Firstly, I will point out the difficulties which beset the above mentioned tract. Scab is there, nay everywhere in this tract. Grain farming is carried on on a large scale. Farms are not very large, and the ground being patchy, paddocks cannot be so arranged as to have vacant land to graze the number of sheep kept, night and day, consequently they must be kraaled. It cannot be denied that kraals are the most suitable sources of infection, when once infested with the scab acari. The grain farmer justly argues: To carry on my grain farming to perfection, the manure of my sheep is entitled to just as much consideration as the wool off my sheep, for with a fairly favourable season, I find my grain crop the main source of my income. This being so, is it a wonder that the grain farmer allows the state of his wool only secondary consideration. These are the difficulties with which the Scab Act has to contend. How can these apparently indisputable arguments be frustrated? I maintain, by adopting the course I suggest. Take such an area where all arguments against scab legislation appear admissible, and prove by a most determined administration that once scab is eradicated it will not again gain a footing. That done there will be no difficulty in forcing the strongest opponent of the Scab Act to submit

The next question to be answered is. Why do you suggest that above mentioned tract of country? In the first place, one boundary at least is safe, namely, the shore. No scab there The Langeberg range, taken as a northern boundary, can only be crossed at certain passes, consequently the area can be well guarded against being overrun by sheep from the north, east and west, consequently the field of operations will be well defined and can be thoroughly isolated.

And now I must revert to the discussion of dips. So far, I have not seen one letter from your correspondents stating that after using Lime and Sulphur Dip he has considered it advisable to revert to Cooper's or any other patent dip. This being so, I would certainly say, in such a severe test as I have suggested, let those entrusted with the cleansing of the specified area be instructed to use only well prepared Lime and Sulphur Dip. I have no doubt that in this area some farmers will be kicking against the traces, on the ground of the expense which such an attempt to cleanse will entail. But considering that the trial to eradicate scab from the Colony has hitherto already cost the Colonial tax-payer a million of money, and considering, moreover, that the great stumbling-block to eradication of scab has been, and still is, "the man who won't believe that scab can be eradicated," I regard it as the sacred duty of every Colonist and each Colonial Government to leave no stone unturned, cost what it will, to remove that stumbling-block, to the successful issue of a most desirable act, viz, to prove to the unbeliever that he is *wrong*.

Too much is being said about the damage to wool by dipping with this or that dip. Our first consideration must not be "*what* the Bradford wool-buyer wants," but "*how* can we most speedily *eradicate scab* from the Colony" Once that has been affected, then by all means let Mr. Bradford Wool-buyer have his say, even to tying fleeces with silk thread, sewing bales with black twine, paper line the sacks, and shear on a boarded floor to avoid foreign particles getting into the wool, etc.

I may add that I have tried the various patent dips in past years, but after experiencing very indifferent results and sometimes losses, I have decided on never using anything but properly-prepared Lime and Sulphur; the outcome of which is no losses, no scab, if properly used, and no re-infection by surrounding scabby sheep.—Yours, &c.,

LOUIS KNOBLAUCH.

Appels Kraal, October 10th, 1905.

Stone Pine Disease

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In connection with the late visit of the British Association, Professor Douglas H. Campbell, of the Stanford University, California, visited South Africa, and being interested in the wild flowers of the Cape, he spent a day at Sir Lowry's Pass.

Whilst he was here, the subject of the disease of Stone Pine (*pinus pinea*) was mentioned, and he at once remarked that there had been a somewhat similar epidemic amongst pines in California, and he asked me what was the supposed cause, to which I replied that it was said to be a fungoid disease.

Professor Campbell was much interested, and stated that the Californian disease was at first said to be a fungoid disease, but that after careful investigation, it was proved to be due to the larvæ (almost microscopic) of a small fly, which laid its eggs at the base of the young spines in the new shoots in the early spring. These larvæ fed on the juices and sometimes killed the young shoot and always had a curious effect in thickening and shortening the spines of the fir tree, till they became half their proper length and three or four times their proper thickness Professor Campbell then inspected several diseased Stone Pines, and pointed out that he had accurately described before-hand what was actually to be seen in the diseased shoots of the Stone Pine, and he asked me to raise the question as to whether the Stone Pine disease might not after all be due to an insect parasite and not to a fungus Trusting that the question raised may interest scientific observers,—Yours, &c.,

H. Le G. Solly.

Sir Lowry's Pass, Sept. 26.

The Destruction of Spring Hares.

To the Editor, Agricultural Journal.

Sir,—I notice in the last issue of the *Journal* "An Old Hand's" or "Oompie's" advice on the destruction of Spring Hares. "Oompie's" advice is to drown them out, catch them and tie a charge of dynamite to their tails, and send them back into the holes again and blow them all up. A thirty-two gallon cask of water he says is sufficient to drown them out. Well I dare say the blowing up with dynamite would be all right, if the charge goes off, but the drowning out is a different thing. A thirty-two gallon cask of water would hardly damp the ground in a spring hares' warren in Bechuanaland, so we have I think a better plan than that. Where water is scarce, we simply take a few iron standards (posts) and drive them in the ground round the spring hares holes and pull a coil of wire netting round the poles, well fastened down to the ground with stones, placing a few steel traps round the enclosure. Now the *Jerboa* (Spring Hare) comes out in the night to feed, and walking round the enclosure looking for an outlet to his feeding ground, generally manages to put his foot in one of the steel traps. Sometimes two or three, or more may be caught in a night in this way. And when finished up simply remove your gear, &c., to another warren and repeat the operation.—Yours, &c.

Farmer.

Bechuanaland, September 22, 1905.

Jackal-Proof Fencing.

Some Corrections.

To the Editor, Agricultural Journal.

Sir,—Having noticed a couple of errors in my paper on Jackal Proof Fencing, I wish you would please correct them. The Ideal Fence should be 19 rolls of cable wire instead of 18½, and height of fence 4 ft. 9 in instead of 6 ft. 9 in. as stated in the paper.

The barbed fence should be 8 wires 3½ inches apart, and 5 wires 4 inches giving a height of 4 feet, 8 inches lower than "Ideal Fence." I did not state, what gauge the weaving wire should be. I am using No. 15 and 14. I like the latter gauge better, it takes more weaving wire, but is more durable.

You will notice I quote Johnson's Resist Steel for the cable wires. Why I have done this, is that 100 lb. of this wire goes 962 yards and has a breaking strain equal to a No. 9 wire. I find it a splendid wire but very brittle, but it does not break in a woven fence. I have some 8,000 yards of woven fence constructed with this wire mostly and it was erected in the cold months of last winter. I have not seen one wire broken, so I think it perfectly safe to use.

I may state that I consider the woven fence a very strong one and can, be made bull and chicken tight. It is all woven into a solid fabric, and twice as strong as the ordinary 7 wire fence. In the woven fence you have 12 wires with a breaking strain each equal to a No. 7 wire. These wires all woven make it a very strong fence.

My advice to those who intend erecting Jackal-proof fences is to come and see for themselves. I have the netting, the 13 barb, and the woven fence and they can then decide which they like best.—Yours, &c.

J. ARNOLD.

Runnymede, September 26, 1905.

Orange Scale—"Lecanium Hesperidum."

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the *Eastern Province Herald* of the 25th inst., I see an interesting paper by Mr. Hewlett on "Insect pests and Remedies," and the remedies given for Orange Scale.

I had a couple of young Orange trees covered with this scale, when a friend advised me to take the "*pens mest,*" of a sheep or goat just after it is slaughtered, mixed with a couple of buckets of water and pour it over the trees. I did so once. Not only are the trees perfectly clean now, but they have also started growth. For a syringe or watering can, first mix well and pour through a sieve.—Yours, &c.

GID. F. JOUBERT.

Welbedacht, Lady Grey, Aliwal North
Sept. 30th, 1905.

The Government Entomologist has no personal experience of this treatment.

Chorea in Pointer Pup.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I would be pleased to have your advice on a pointer pup afflicted with the chorea. The pup is about eight months old and has not had, as far as I am aware, the distemper. A medical friend treated the dog with a strong tonic which apparently did it no good. The dog has had the disease four months, and is afflicted, apparently only on one side of its body, mainly in one foreleg, and grows neither better nor worse. Is there any likelihood of the dog growing out of the disease, and is there any certain cure for it?—Yours, &c.

A. J. THOMAS.

Robertson, Sept. 25th, 1905.

"This nervous involuntary twitching of the muscles is seen in young animals generally as the result of some previous attack of sickness such as distemper and it has been frequently noticed in dogs affected with worms. The prognosis of this disease is very unsatisfactory, treatment is not generally of much avail, but is attended with greater success in the young than in the full grown animal. It would be advisable to first treat the dog for worms by giving Areca Nut, freshly powdered or ground, fasting—the dose will vary with the size of the animal—about half a drachm (half-a teaspoonful) daily for a week. Discontinue for a week and again resume daily dosing. See bowels are kept open by a little Castor Oil and Syrup of Buckthorn if required.—W. R.

Stones in Boreholes.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—*Re* "the best means to take out stones from a two-inch bore-hole." I think Mr McDonald cannot do better than get a one-and-a-half inch hand bore and drill them out. Seeing that he has an overflow from the hole, that will be an easy matter. I had some experience in clearing a six-inch hole, not only of stones, but of wagon-tyre iron, wire, bags, and a lot of rubbish, that some evil scoundrel put down not long after the hole was drilled. The hole was 85 feet deep, and it took me a week to clear it, and now I have a windmill over the hole yielding 75,000 gallons a day. This is a warning to others to cover the holes properly soon after boring is completed.—Yours, &c ,

S. HARRIS.

Aliwal North, October 11.

Arsenite of Soda for Cattle-Dipping.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I should like to thank Mr. Edmonds and the Veterinary Surgeon Department for endeavouring to get something cheaper and more destructive for the destruction of ticks than the patent dips we have been using.

It is not so much the first cost of filling a tank with dip if we could only use it all; but when we have to empty the tank and throw the remaining dip away after it has only been there a comparatively short time, it is then that it becomes so costly to one who has a private dipping tank.

What per cent. of its strength would Arsenite of Soda lose after it has been in the dipping tank for two months or more?—Yours, &c.

JOHN SURMON.

Driefontein, Breakfast Vley,
October 13th, 1905.

The Dip will not lose its strength with age. Arsenite of Soda makes a perfect solution with water, and if the tank contains a certain strength of Arsenite of Soda per gallon of water at start it may contain much less solution after a fortnight's dipping, but the residue in the tank will still contain the orginal percentage of Arsenite of Soda.

RURAL REPORTS.

For the month ending 15th October, 1905.

Aberdeen.—Weather here at present mild. We have had a very heavy rainfall during the past month and far above the average, 6·8 inches and more having fallen in some parts of the district. Veld is now in very good condition, but young. All crops promising after the splendid rains just experienced. Fruit ditto. Cattle are improving in condition. Not many calves are expected as animals were in poor condition during the summer. Very little dairying done here. Slaughter stock scarce but in good condition. Horses mules, etc., in fair condition, and improving Values medium. Sheep and goats are in good condition, also ostriches. Pigs not plentiful in this district.

Bedford.—The rainfall has been the best known for a great many years. Weather still very rainy, and south-easters prevalent. The veld is now growing fast, and Karoo is already in splendid order although grass is still a bit short. We should have a good harvest of oats and mealies if too much rain does not cause rust. Heavy crops of lucerne are expected this season. Cattle are now improving in condition though still rather low as grass is very short. Not many calves are expected. Slaughter animals not plentiful nor in good condition. Sheep are doing well and lambing season has been a good one so far. Slaughter stock in good order and fairly plentiful. Kidding season is now on and should be a good one. A few kids were lost during the heavy rains. Ostriches are all in good condition and laying well. We would have had many chicks this season had it not been for the heavy rains during hatching.

Carnarvon.—Veld here is plentiful but dry. Average rains have fallen during the month. Weather at present mild. Wheat crop not coming on well. Oat crop small but in fair condition. Livestock of all descriptions are in good condition. Horses, mules, etc., selling at high prices. Scab breaking out on some farms. Goats are breeding well.

Queenstown.—We have had splendid rains here, and the fall for September was higher than it has been for many years. Weather wet and cold during part of the month. The Winterberg was covered with snow on the 30th September. Veld is in very good condition as compared with previous years. Great quantities of wheat and oats have been sown and are growing well since the rains began to fall Lucerne also coming on nicely. There are prospects of a very fair crop of fruit, peaches, apples, pears, figs, and plums being the principal kinds. Cattle are now picking up nicely. Poor calving season expected. Horses, etc., in poor condition. Prices high A bad foaling season is expected on account of last season's drought Sheep in good condition and lambing well.

Riversdale – We are having rather variable weather here just at present, changing from hot to cold. A good average rain has fallen, and veld is now in good condition. There are prospects of good crops of wheat and oats. Lucerne doing well. Cattle in good general condition. Dairying has been fairly successful so far. Slaughter stock scarce. Horses, mules, etc, in good condition, as are also sheep. Goats are in fair condition. Ostriches are doing well, and there are plenty of chickens. Pigs thriving.

THE TRANSKEI.

For month ending 30th September, 1905.

Cofimvaba.—Abundant rains (in all 3·23 inches) have fallen during the past month, with alternating warm days, and the pasturage is all that could be desired. The standing crops of wheat and forage have been much benefited, and ploughing for mealies and Kafir-corn crops has been extensively carried out. As a result of the rains, the price of mealies in stock has fallen considerably. There have been no reports received as to any outbreak of serious diseases amongst stock, and all animals are in good condition.

Flagstaff.—Since my last report for August we have had heavy rains in the district; the country is looking, to say the least of it, beautiful, and the natives are ploughing and hoeing vigorously. Stock are in very fair condition and practically free from disease.

Kentani.—Heavy rains having fallen during the past month, the natives were and are, able to commence ploughing on a large scale. Kafir-corn is the chief seed being sown. Pasturage is in magnificent condition. Lungsickness still prevails in many localities.

Kokstad.—An average rain has fallen during the past month, and veld is in fairly good condition. The weather has been very changeable, cold mornings, followed by hot, windy days. Wheat fair. Oats looking well, and crops should be good Natives have commenced sowing Kaffir corn in some parts of the district. Cattle in good condition. Calving has been good. A good deal of butter and cheese is being made. Slaughter stock are in good condition. Large numbers of oxen are being sent to Natal and Transvaal Horses in very good condition. Prices range from £15 to £25 each for riding animals and £45 to £60 per pair for draught ones Sheep in good condition. Very little scab. Goats and pigs scarce.

Libode.—During the month of September the Spring rains commenced, enabling the people to plough. The veld is beautifully green, and stock of all kinds are in excellent condition. There is every prospect of a good season.

Matatiele.—This district, I am pleased to report, is at the present time entirely free from contagious or infectious disease amongst stock; cattle, horses, and sheep are in good condition, considering they have just come through a very dry winter. Two days' good rain (2·12 inches) fell during the past month, but was unfortunately followed by two very severe frosts, which have considerably retarded pasturage and nipped off a good deal of early fruit. Ploughing operations have now commenced in earnest, a good deal of new land is being broken up, and the prospects of an abundant yield during the next reaping season are most favourable. More rain is still badly wanted, however. The lambing season has commenced and promises well, as the ewes are in good condition and have plenty of milk to nourish the young. Hamels are scarce, and fetch very high prices, 25s. to 28s. being the ruling market prices. Slaughter stock are plentiful, but there is no demand. This district continues to furnish a considerable supply of Basuto ponies for remount purposes, over 2,000 having been purchased and taken out of the district during the past month.

Mount Ayliff.—Weather very changeable. Rainfall has been heavy for this time of year, viz., 2·76 inches. Veld in excellent condition. As a result of the early rains a good deal of land has been ploughed and sown with mealies and Kaffir corn. There are prospects of a heavy fruit crop, consisting of peaches, apricots, plums, figs, apples, etc. No diseases or insect pests in evidence as yet. Vines flourishing. Livestock of all descriptions are in good condition. Slaughter animals scarce.

Mount Frere.—Very nice rains fell during the month and quite established the grass, which was not bad. The veld is now excellent, and all classes of stock are looking well. The lambing season has been good, and the winter lambs and kids are the finest seen for many years. Calving does not compare so well numerically with former seasons, though the calves coming on are very fine. This is attributed to the severe drought last season, and the consequent low condition of the cows. Calving will be much later this season. Slaughter stock is not plentiful, though what there is is in good condition. These is still a good deal of mange in horses, otherwise the district is fairly free from disease. Ploughing has begun, but not much has been done in that direction, so far.

Nqamakwe.—Rain was general throughout the district during last month, and the total rainfall registered here amounted to 5·18 inches which was the highest September rainfall since 1898. The Natives are taking advantage of the rain to plough more extensively than has been done for many years, and there is every prospect of a good season. The lambing season was also good, and it is considered the Natives will soon be as well off, in regard to sheep, as they were before the drought of last year, even taking into account the number of sheep sold from the district since the beginning of 1904.

Tabankulu.—The present spring is the most favourable that we have had for the past ten years, succeeding a winter of exceptional mildness. The consequence is that the lambing season has been an excellent one, and that all stock is looking unusually well. Ploughing is being carried on generally, and there is every prospect that large crops will be grown this year.

Tsolo.—Splendid rains fell during the early part of the month, the veld is excellent, grass being already in seed. Ploughing has been commenced and the growing crops of oats and wheat promise well. The lambing season was a record one, and all stock are in excellent condition. No cases of contagious diseases have been reported. Fruit trees of all kinds are laden. Rainfall Sept., 1905, 2·44 inches and Sept., 1904, 0·55 inches; Days of rain in Sept., 1905, 15, and in Sept., 1904, 6; Greatest amount in one day in Sept., 1905, 0·93 inches and in Sept., 1904, 0·20 inches; Frost in Sept., 1905, 2 nights and in Sept., 1904, 6 nights.

Umtata.—There is no matter of particular interest to note concerning the past month. The expectation for a good season continues to exist and crops of corn and forage give promise of a very heavy yield. Continuous showers of rain have fallen and the pasturage is in excellent condition. Stock are looking well and no diseases have broken out during the month.

Willowvale.—Splendid rains have fallen during the month, and the natives are ploughing every available land. Should the rains continue there is every prospect of a good season. The condition of stock generally is good. No change in the prices. Quarter Evil and Lungsickness still continue to affect cattle.

NOTES ON THE WEATHER OF SEPTEMBER, 1905.

By Charles M. Stewart, B.Sc., Secretary to the Meteorological Commission.

An exceptionally heavy rainfall, practically general to the whole country, causing a complete break-up of the drought, together with heavy floods, an unusually large number of thunderstorms, a high percentage of cloud, with daily fogs, a mean temperature about the average with cool days and mild nights, a fair number of frosts of no great severity were the leading features of the weather of September.

Precipitation.—The mean rainfall during September last, as shewn by the records of 337 gauges, amounted to 3·84 ins., being 2·17 ins., or 130 per cent. above the average. (If, however, we take into account 74 additional gauges in the Orange River Colony, it is found that the mean precipitation of the 411 stations was 3·34 ins., or exactly double the average for September.) This exceptionally heavy rainfall for September seems to have affected the greater part of the country, breaking up the long-continued drought over the Karoo where the excess varied from 228 per cent over the Northern to 667 per cent. over the West Central. The heaviest rains fell along the South Coast where the mean for the month reached the unusually large amount of 9·84 ins. being about four and a half times the usual quantity. The only areas where the rainfall was under the average were the more Northerly portions of South Africa and the extreme South-West, viz., Rhodesia, Bechuanaland, the Northern Border and the Cape Peninsula; apparently a deficiency prevailed in Natal where Durban had an inch less than usual. On examining the monthly returns, it is found that out of 337 stations only two (viz., Bellsbank and Hopefountain) had 'no rain' during the month. Of the other stations only 35 had 1 inch or less; while 65 had 1—2 ins.; 57 had 2—3 ins.; 52 had 3—4 ins.; 4—5 had 45 ins; 29 from 5 to 6 ins; 15 from 6 to 7 ins.; 8 from 7 to 8 ins. Quantities exceeding 8 inches were registered at 29 places principally along the South Coast, although six of these stations were distributed over the Southern Karoo, the West

Division.	Mean Rainfall (1905).	Mean No. of Days.	Average Rainfall (1894-1903).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ..	3·18	9	3·74	11	— 0·56	— 15
South-West ..	2·66	6	2·18	6	+ 0·48	+ 22
West Coast ..	1·39	5	0·88	4	,, 0·51	,, 58
South Coast ..	9·84	10	2·19	7	,, 7·65	,, 349
Southern Karoo ..	4·09	6	·96	3	,, 3·14	,, 330
West Central Karoo ..	4·14	6	·54	2	,, 3·60	,, 667
East Central Karoo ..	4·37	10	·87	3	,, 3·50	,, 402
Northern Karoo ..	2·10	8	·64	2	,, 1·46	,, 228
Northern Border ..	32	3	·37	1	— 0·05	— 14
South-East ..	4·92	12	1·72	5	+ 3·20	+ 186
North-East ..	3·06	11	·86	3	,, 2·20	,, 256
Kaffraria	3·16	11	1·41	4	,, 1·75	,, 124
Basutoland ..	2·23	6	1·22	4	,, 1·01	,, 83
Orange River Colony ..	1·10	4	·73	2	,, ·37	,, 50
Durban (Natal) ..	2·39	8	3·49	.	— 1·10	— 31
Bechuanaland ..	·37	2	·47	1	,, 0·10	,, 21
Rhodesia	02	1	·16	1	,, 0·14	,, 88

Central Karoo and the South-East. Of these 29, 9 had 8—10 ins.; 11 had 10—12 ins.; 2 between 18 and 14 ins.; 4 from 14 to 16 ins.; and three between 18 and 20 ins. The three largest monthly totals registered were 19·41 ins. at Lottering in the Knysna District; 18·91 ins. at George; and 18·65 ins. at Blaauwkrantz. The largest total measured outside the South Coast Division was 14·85 ins. at the Zwartberg Pass. Similarly exceptionally heavy falls in the 24 hours were noted, especially along the South Coast and at a few places in the Southern and West Central Karoos, where cases of heavy floods, causing a considerable amount of damage, especially to the railways, were commonly reported (*e.g.* George, Oudtshoorn, Glenconnor, Brak River, Uitenhage District, &c. Of 330 stations, giving particulars of the daily rainfall, 154 had maxima of 1 inch or less; 128 had 1 –2 ins.; 24 had 2 –3 ins.; 12 from 3 to 4 ins.; and 10 between 4 and 5 ins. The remaining five having a maximum daily rainfall exceeding 5 inches were entirely confined to the South Coast Division, and were the following; George (Plantation), 5·98 ins. on 12th; Mossel Bay, 6·15 ins. on 24th; George (gaol) 7·05 ins., Blaauwkrantz, 8·03 ins., and Lottering 9·07 ins., all an the 12th

Thunderstorms were reported from altogether 343 places on 25 days of the month, most generally on the 11th, 2nd, 24th and 12th. These storms were of daily occurrence from 1st to 15th, 21st to 25th, and 25th to 30th. *Hail* fell chiefly in connection with these thunderstorms at 21 stations on 10 days, especially from 10th to 13th and the 30th, although, curiously enough, on the last date, the number of hailstorms was in excess of the thunderstorms. *Snow* fell at 22 stations on 7 days of the month, more particularly on the 30th, 29th, 15th and 16th. *Sleet* was reported from 22 stations on 6 days, and most widely on the 30th and 16th.

Temperature, *Cloud*, *Wind*.—In spite of an unusually large percentage of Cloud, and the abnormally heavy rainfall, the temperature curve shews a marked upward tendency, the mean temperature for the month being 58·4° or 6·3° warmer than in August. Indeed the mean for September last is only 0·2° lower than the average, the day temperature (69·5°) being however 0·8° lower, and the night temperature (47·2°), 0·4° higher than the average, both differences, in all probability, being chiefly due to the 'blanket' effect of the increased percentage of Cloud. Consequently, the main daily range (22·3°) is 1·2° less than the average. Speaking broadly the mean monthly temperature was practically the same as the average at the Coast stations, the mean maxima being below the average by quantities varying between 0·5° and 1·5°, these deficits, however, being counterbalanced by a corresponding increase in the values of the mean minima. At some of the inland stations in the South-West, the mean temperature was about 1·0° warmer than usual whilst over the Karoos and the High Veld the air temperature was about 1·5° cooler than usual, both day and night temperatures being below the average; whilst at such stations as Aliwal North and Queenstown, the increase in the night temperatures was only equal to about half the decrease in the day temperatures, thus causing these stations to be about a degree colder than the normal. The mean warmest station was Hopefountain (near Bulawayo) with a mean temperature of 69·4°, and the mean coldest was Hanover with 51·0°, a difference of 18·4° The highest value of the mean maximum temperature was 84·4° at Hope Fountain, and the lowest mean minimum, 34·8° at Hanover. The highest temperatures were recorded mostly during the period, 17th to 20th, although absolute maxima occurred also on the 6th—7th, 21st to 25th, 28th and 29th. The lowest temperatures clustered round three periods, viz., 1st to 3rd, 9th, and 16th to 18th. The mean value of the absolute maxima was 84·2, and of the absolute minima 35·4°, thus showing a mean monthly range of 48·8; both extremes being about four degrees higher than in August. The highest and lowest temperatures recorded during September were 95·0° on the 21st at Kimberley, and 21·0° on the 3rd at Hanover, an extreme monthly range of 74·0°. Temperatures of 90° or over were limited to 9 stations while temperatures of 32·0° or lower were reported from 17 stations. Although *Frosts* were fairly frequent throughout the month, they were mostly light and seem to have caused little damage to fruit trees except round about Kokstad; these were reported from 26 stations on 8 days.

The mean percentage of *Cloud* was exceptionally high (53 per cent.) and all over the country, ranging from 74 per cent at Disa Head (Table Mountain) to 19 per cent. at Hope Fountain. The monthly mean (53 per cent.) was 11 per cent. above the normal and 13·5 per cent. higher than in August. As a matter of fact the percentage of Cloud was remarkably uniform over the country, even in the interior, being mostly 60—70 per cent. along the coasts and 35 to 50 per cent. in the interior. Indeed, Hope Fountain was the only station having its sky less than one-third obscured. *Fogs or Mists* were reported every day except the first, chiefly from the 22nd to the 25th, and on the 7th, 8th, 11th, and 27th; these occurred at altogether 110 stations.

North-westerly *Winds* (*i.e.*, N. to W.) were slightly in excess over the greater part of the country, during the morning, although at the majority of the stations Northerly and Southerly winds were about equal in frequency. The mean Force was 2·10, equivalent to a mean velocity of 18·5 miles per hour, or slightly less than the previous month. Calms were frequent throughout the month, although the wind was reported to have attained the force of a gale on eight days of the month, particularly on the 28th and 29th, when a moderate North-westerly gale prevailed over the South-West. The greatest destruction, however, was caused on the early morning of the 29th (about 5.30 a.m), when a Tornado or enlarged Whirlwind passed diagonally over Malmesbury, uprooting and breaking trees, utterly destroying many houses, the falling debris from which unfortunately caused the death of several people. The hourly wind velocity at the Royal Observatory was only 40 miles between 4 and 5 a.m, dropping to 30 miles between 5 and 6 a.m.; during the previous day it had attained the velocity of 45·5 miles between 3 and 4 p m. *Duststorms* were reported on one day and Hot Winds on three.

OBSERVERS' NOTES.

EZELJAGT.—Record month—not had so much rain for the last twenty years. Good deal of damage done to live stock on neighbouring farms.

PLETTENBERG BAY.—Heaviest rain that has fallen in this place during one month.

BOSCHFONTEIN.—Prevailing winds, N.W. Very cold after rains, with S. and S.E. winds and occasional frosty nights.

CARNARVON FARM.—This is the best rainfall (3·51 inches) we have ever had for September, the next best was September, 1901, when we had 2·25 inches. Fountains that have long since ceased to flow, have started running. Crops all over this part of the Colony are good so far. Locusts about, but have done very little damage as yet. Frosts—ten, all more or less light; no cloudless days; seven windy days.

THIBET PARK.—Heaviest rainfall for September since register has been kept at Thibet Park. Rivers are running strong.

KOKSTAD.—From middle of month, strong winds, accompanied by duststorms, prevalent. Veld good; country, through rains, suitable for ploughing. Stock in good condition; no diseases.

GROOT DRAKENSTEIN.—Temperature—just the average for six years. The rainfall at the end of the month was much needed and greatly benefited crops, though the gale which accompanied it did some little damage.

DUNBRODY.—Influenza following in the wake of the rains.

MOUNT AYLIFF.—Owing to the early rains, the veld is in excellent condition, and the Natives are doing a good deal of ploughing.

KOKSTAD (THE WILLOWS).—Beautiful rains early in the month, but severe frosts destroyed the fruit on many farms. Extremes of heat and cold—very changeable temperature. Pneumonia (one fatal case) and influenza very rife. Grass coming on well.

TEMPERATURE, SEPTEMBER, 1905.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory ..	64·6	51·0	58·0	80·7	17	44·0	17
Sea Point ..	65·4	51·1	58·2	76·2	26	43·0	9
Simon's Town	67·6	53·9	60·7	78·0	26	47·8	9
S.A. College	67·4	49·6	58·5	82·0	17	39·5	9
Wynberg	66·7	51·0	58·9	84·5	17	47·0	9
Groot Constantia ..	64·2	50·1	57·2	78·0	17	46·0	9 & 19
Robertson	70·7	45·2	58·0	88·0	18	35·0	8
Elsenburg	65·9	46·0	56·0	78·5	17	34·0	9
Groot Drakenstein ..	68·9	48·1	58·5	84·6	18	38·6	9
Ceres	67·5	42·6	55·0	70·0	10 & 19	33·0	1
O'okiep	67·4	45·8	56·6	82·9	18	38·3	17
Abbotsdale (Nr. Malmesbury)	68·1	46·7	57·4	81·0	17	34·0	9
Cape L'Agulhas ..	63·0	53·5	58·2	71·0	23	46·0	1
George (Plantation) ..	65·4	49·2	57·3	78·5	10	40·0	9
Heidelberg	73·7	45·9	59·8	90·0	18	32·0	9
Cape St. Francis ..	63·9	53·4	58·6	67·0	23 & 26	43·0	19
Port Elizabeth ..	66·7	53·9	60·3	76·0	6	44·0	2
Dunbrody	76·0	49·6	62·8	88·3	19	32·8	1
Uitenhage	74·3	49·2	61·8	90·3	19	36·0	1
Van Staaden's River ..	69·6	49·8	59·7	84·0	7	38·0	1
Amalienstein	72·3	45·0	58·7	86·0	19	31·0	1
Rust en Vrede	67·2	42·3	54·8	80·0	19	28·0	9
Somerset East	69·8	45·2	57·5	86·2	22	33·6	1
Wagenaar's Kraal ..	67·6	42·6	55·1	83·0	20	29·0	9
Hanover	67·2	34·8	51·0	82·0	20 & 21	21·0	3
Murraysburg	70·0	42·5	56·2	84·0	20	31·0	1 & 16
Hope Town	74·0	44·5	59·2	91·0	23	32·0	17
Kimberley	78·3	45·9	62·1	95·0	21	31·9	18
East London	69·0	55·1	62·0	80·0	3 & 30	46·0	1
Sydney's Hope	67·7	50·4	59·0	84·5	6	40·0	16
King William's Town ..	72·9	50·2	61·5	91·5	6	38·0	16
Stutterheim	68·5	49·5	59·0	85·5	20	38·0	1 & 16
Queenstown	70·6	45·6	58·1	88·0	28	30·0	17
Rietfontein (A. N.) ..	65·1	40·9	53·0	82·0	24	29·8	17
Aliwal North	68·6	42·3	55·5	87·0	24	29·0	17
Matatiele	72·4	44·7	58·5	87·8	28	27·0	18
Mount Ayliff	73·4	48·5	61·0	92·5	28	35·0	30
Port St. John's	72·3	55·9	64·1	86·0	7	47·0	2
Kokstad (The Willows) ..	70·0	42·9	56·4	88·6	28	29·5	18
Main	69·1	47·9	58·5	87·5	28	34·5	17
Umtata	73·1	47·4	60·2	91·0	20	34·0	1 & 2
Teyateyaneng	69·3	40·6	54·9	85·0	22	26·0	16
Leribe	70·6	42·6	56·6	90·6	5	26·0	16
Mafeteng	67·7	43·7	55·7	89·0	2	26·0	16
Mohalie's Hoek ..	67·8	42·3	55·0	85·0	25	24·0	17
Winburg (O.R.C.) ..	77·2	46·4	59·8	87·5	24	28·8	16
Hope Fountain ..	84·4	54·4	69·4	92·0	28	45·5	18
Means	69·5	47·2	58·4	84·2	..	35·4	..
Extremes		..	..	95·0	21st	21·0	3rd

RAINFALL, SEPTEMBER, 1905.

I. CAPE PENINSULA:

	INCHES
Royal Observatory, (a) 12 inch gauge	1·59
Cape Town, Town House	1·45
Do South African College	2·10
Do Sea Point (Hall)	1·71
Do do (Attridge)	1·67
Do Molteno Reservoir	1·98
Do Platteklip	2·43
Do Signal Hill	1·29
Table Mountain, Disa Head	2·26
Do Kasteel's Poort	4 73
Do Waai Kopje	6·21
Do St. Michael's	6·56
Bishopscourt	7·65
Kenilworth	4·97
Wynberg (St Mary's)	6·06
Groot Constantia	4·80
Simon's Town (Wood)	3·74
Do. (Gaol)	3·81
Robben Island	1 12
Camp's Bay	1·22
Fish Hoek	2·54
Cape Point	0 60
Woodstock	1·85
Plumstead	5·31
Woodstock (Quarry)	1·96

II. SOUTH-WEST.

Eerste River	2 20
Klapmuts	2·68
Somerset West	3 01
Paarl	3·45
Wellington (Gaol)	2·28
Tulbagh	2·43
Kluitjes Kraal	2·46
Ceres	5·23
Caledon	5 91
Worcester (Gaol)	1·64
Hex River	2 02
Lady Grey (Div. Robertson)	1·26
Robertson	2·59
Robertson (Govt. Plantation)	1·65
De Hoop (Div. Robertson)	0·52
Groot Drakenstein (Weltevreden)	2·94
Porterville Road	2·47
Rawsonville	4·41
Worcester (Station)	2·02
Elsenburg Agricultural College	2·18

III. WEST COAST·

Klipfontein	1 37
Kraaifontein	0·65
O'okiep	1·09
Garies	0·15
Kersefontein	1·32
The Towers	2·06

III. WEST COAST—*continued*

	INCHES
Dassen Island	1·48
Piquetberg	3·08
Van Rhynsdorp	0·20
Clanwilliam (Gaol)	1·08
Welbedacht	1·60
Lilyfontein	3·84
Wupperthal	1·57
Concordia (Krapohl)	1·16
Anenous	1·08
Zoutpan	1·02

IV. SOUTH COAST:

Cape L'Agulhas	0·81
Swellendam	5·15
Heidelberg	3 03
Riversdale	2 93
Geelbek's Vlei	9·86
Mossel Bay	10·58
George	18·91
Ezelzagt	13·17
Knysna	11·05
Plettenberg Bay	11·36
Blaauwkrantz	18·65
Witte Els Bosch	13·50
Cape St. Francis	7·73
Hankey	11·94
Witteklip	14·89
Uitenhage	11 21
Do (Inggs)	10·80
Dunbrody	5·37
Port Elizabeth (Harbour)	7·71
Tankatara	7 06
Lottering	19·41
Shark's River (Nursery)	9·28
Do (Convict Station)	8·86
Grootvader's Bosch	9·35
Potberg	2·44
Centlivres	8·01
Armadale (Blue Cliff)	8·12
Kruis River	11·20
Uitenhage (Park)	11·03

V. SOUTHERN KAROO:

Touws River	0·50
Ladismith	4 50
Amalienstein	3·88
Calitzdorp	4 00
Oudtshoorn	6·48
Uniondale	8 40
Kleinpoort	8·28
Rust en Vrede	9·32
Verkeerde Vlei	1·46
Bok River	2 40
Triangle	1·22
Pietermeintjes	1·34
Grootfontein	1·34

VI. WEST CENTRAL KAROO:	INCHES
Matjesfontein	0·82
Prince Albert Road	2·10
Fraserburg Road	1·29
Prince Albert	1 87
Zwartberg Pass	14·85
Beaufort West	6·15
Nel's Poort	4·46
Camfer's Kraal	8·81
Baaken's Rug	5 97
Willowmore	3·23
Steytlerville	5 58
Laingsburg	0·47
Krom Rivier	2 12
Bietfontein	5·22

VII. EAST CENTRAL KAROO:	
Buffelskloof	7 00
Aberdeen (Gaol)	5·37
Do (Bedford)	6·06
Winterhoek	4·41
Klipdrift, De Erf	4·36
Kendrew	4 68
Graaff-Reinet	4 41
New Bethesda	1 76
Roode Bloem	2 86
Jansenville	7 46
Patrysfontein	2 05
Toegedacht	4 53
Klipfontein	3 82
Cranemere	2·82
Pearston	4 12
Somerset East	4 48
Do (College)	4·38
Corndale, Div. Aberdeen	6 80
Middlewater	4 97
Darlington	4 36
Spitzkop (Graaff Reinet)	5·19
Arundale	4·39
Walsingham	4 43
Rode Hoogte	1·43
Glen Harry	2·16

VIII. NORTHERN KAROO:	
Calvinia	2·22
Sutherland	1·10
Fraserburg	0·50
Droogefontein	1·53
Wagenaar's Kraal	1·20
Brakfontein	2·23
Victoria West	0 79
Britstown	2 13
Murraysburg	1·73
De Kruis	5·46
Richmond	2·20
De Aar	2·31
Hanover	1·88
Philip's Town	0·91
Boschfontein	1·80
Petrusville	0·91
Middleburg	1·15
Colesberg	1·76
Tafelberg Hall	1·01
Cradock (Penny)	3·16
Witmoss	4·09

VIII. N. KAROO—*continued*	INCHES
Steynsburg	2·73
Quagga's Kerk	5 26
Tarkastad	3 34
Riet Vlei	3 21
Culmstock	1·39
Glen Roy	4·32
Wildebeestkooij	1·39
Zwavelfontein	0·68
Vosburg	2·10
Schuilhoek	1·47
Waverley	3 06
Maraisburg	2·45

IX. NORTHERN BORDER:	
Pella	0·04
Kenhardt	0·45
Van Wyk's Vlei	0·58
Prieska	0 62
Dunmurry	0 24
Griqua Town	0 51
Douglas	0·25
Hopetown	1·04
Newlands (Div. Barkly West)	0 21
Kimberley (Gaol)	0·06
Do (Harrison)	0·15
Bellsbank (Div. Barkly West)	0·00
Barkly West	0·18
Upington	0·10
The Halt	0·08
New Year's Kraal	0·26
Karree Kloof	0 69

X SOUTH-EAST:	
Fairholt	4·75
Alicedale	4·59
Bedford (Gaol)	3 68
Sydney's Hope	5·26
Adelaide	3·21
Atherstone	5 08
Alexandria	7·81
Salem	4·12
Graham's Town (Gaol)	5 73
Heatherton Towers (near Graham's Town	3·78
Fort Beaufort	3 32
Katberg	5·95
Balfour	5 44
Seymour	5·54
Glencairn	10·16
Port Alfred	
Hogsback	7·03
Thaba N'doda	5·62
Peddie	4·11
Cathcart	3 50
Keiskama Hoek	5·70
Thomas River	3·67
King William's Town	3·39
Do Hospital	4·20
Stutterheim (Besté)	3·18
Dohne	3·86
Sunnyside	4·45
Melrose (Div. Bedford)	3·84
Daggaboer	3·05
Kubusie	3·16

X. SOUTH-EAST:

Blaney	2·21
Kei Road	4·78
Evelyn Valley	10·34
Berlin	3·93
Isidenge	6·89
Perie Forest	4·34
Quacu Fores	3·20
Kologha	4·48
Fort Jackson	4·42
Komgha	4·69
Prospect Farm (Div. Komgha)	4·20
East London, West	4·86
Do East	6·02
Fountain Head	5·49
Fort Cunynghame	4·78
Bolo	5·01
Fort Fordyce	5 84
Cathcart	3·71
Albertvale (Div. Bedford)	3·35
Blackwoods	5·93
Mount Coke	5·10
Dontsah	5 64
Wolf Ridge	6·68
Chiselhurst	5·79
Forestbourne	5·31

X. NORTH-EAST:

Venterstad	2 00
Ellesmere	1 80
Molteno Station	3·10
Thibet Park	3·32
Sterkstroom (Gaol)	3·57
Rocklands	3 03
Aliwal North (Gaol)	1·87
Do (Brown)	2·06
Rietfontein	3·17
Carnarvon Farm	3·51
Jamestown	2 71
Queenstown (Gaol)	3·11
Do (Beswick)	4·10
Herschel	4·78
Lady Grey	4·46
Bolotowa, Contest	3·37
Lady Frere	3·46
Keilands	2·58
Barkly East	3 38
Lyndene	1·93
Mooifontein	1·99
Poplar Grove	2·68
Biesjesfontein	1·09
Whittlesea	2·71
Bensonvale Inst. Herschel	3·65
Glen Wallace	3·41
Hughenden	1·34
Albert Junction	1 91
Table Hill	6·50
Blikana	3·38
Halseton	3·47

XII. KAFFRARIA:

	INCHES
Slaate, Xalanga	3·08
Ida, Xalanga	2·97
Cofimvaba	3·23
Nqamakwe	5·18
Main	2·92
Engcobo	2·54
Butterworth	3·32
Kentani	4·91
Maclear	1 90
Idutywa	1·83
Mount Fletcher	2·19
Elliotdale	3·66
Mqanduli	3·30
Matatiele	1·50
Umtata	2·36
Kokstad	2·08
Port St. John's	4·56
Tabankulu	3·61
Somerville (Div. Tsolo)	2·44
Tsomo	4 46
Mount Ayliff	2·78
Flagstaff	4 56
Wanstead	1·88
Cedarville	2·12

XIII. BASUTOLAND:

Mafeteng	2·28
Mohalie's Hoek	2·39
Qacha's Nek	1 93
Teyateyaneng	2·38
Leribe	2·37
Maseru	2·02

XIV. ORANGE RIVER COLONY

Philippolis	0 06
Bloemfontein	0·42
Wepener	0·24
Fauresmith	0 72
Frankfort	0·50
Ladybrand	2·12
Modder Poort	1·46
Imperani	1 82
Boshof	0 10
Bethlehem	1·83
Wilgeboom Nek	1·52

XV. NATAL

Durban, Observatory	2·39

XVII. BECHUANALAND

Vryburg	0·34
Taungs	0 46
Zwartlaagte	0·53
Setlagoli	0·16

XVIII. RHODESIA:

Hope Fountain	0 00

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 14th October, 1905, ruling at the several centres named, is published for general information:—

CENTRE.	A Wheat per 100 lb.	B. Wheat Flour per 100 lb	C. Boer Mea per 100 lb.	D. Mea'ies per 100 lb.	E. Mealie Meal per 100 lb.	F. Barley per 100 lb.	G. Oats per 100 lb	H Oat-hay per 100 lb	J. Potatoes per 100 lbs.	K Tobacco (Boer Roll) per lb.	L Beef per lb	M. Mutton per lb	N. Fresh Butter per lb.	O. Eggs per doz	P. Cattle (Slaughter)	Q. Sheep (Slaughter.)
	£ s d.	£ s d	£ s d	£ s d	£ s. d.	s d.	s d	£ s. d	£ s. d.	£ s d	s d	s d.	£ s. d.	s. d. 1 9		
Aliwal North ...	0 12 0	0 18 6	0 13 0	0 6 0	0 8 6	10 0	9 0	0 7 6	0 8 6	0 1 6	*0 4	*0 4½	0 2 6	1 3	£13	21/- to 24/-
Beaufort West .	0 12 3	0 17 6	0 12 9	0 8 0	0 11 0	10 0	9 0	0 6 3	0 11 6	0 0 9	*6d to 1s †5d to 10d	*7d to 8d †5d to 6d	0 1 6	1 0	£16	25/-
Burghersdorp ...	...	...	...	...	...	...	...	...	...	...	*0 7	*0 8	0 1 3	1/- to	...	...
Cape Town ...	0 9 3	0 13 3	0 10 3	0 7 0	0 8 0	7 6	7 0	0 4 0	8/- to 9/4	0 0 8	0 9	0 7½	1/1 to 1,3	1/3 1 0	£16 to £20	26/-
Clanwilliam ...	0 13 0	..	0 14 0	0 10 0	...	...	10 0	...	...	0 3 6	*0 8	*0 8	0 1 3	1 5	...	...
Colesberg ..	...	...	...	0 5 9	...	...	...	...	0 18 0	...	...	0 6½	0 1 3	1 3	...	...
Cradock .	..	...	...	0 5 6	...	...	...	0 10 0	1 0 0	.	.	0 7	0 1 8	1 0	...	...
Dordrecht ..	0 14 0	0 14 6	0 12 6	0 6 6	0 8 6	10 0	9 0	0 6 6	0 12 0	0 1 0	0 10	0 9	0 1 6	1 5	£13	25/-
East London ...	0 13 0	0 14 6	0 12 6	0 7 0	0 10 0	8 0	9 0	0 7 0	0 16 0	0 1 6	†6d & *9d	†6d & *9d	0 1 11	1 0	£22	36/6
Graaff-Reinet ...	0 10 6	...	0 12 6	0 6 6	...	8 0	9 0	0 7 0	0 18 0	0 0 6	0 7	0 7	0 1 9	1 1	£10 to £12 10s	20/- to 25/-
Graham's Town	..	...	...	0 7 6	...	8 3	...	0 5 3	0 15 0	...	*0 8	*0 8	0 2 0	1 6	...	...
Kimberley ...	0 11 0	0 14 3	0 13 0	0 6 0	0 6 0	9 0	8 6	0 5 6	1 10 0	0 0 8	0 10	0 8	0 1 6	1 0	£13 to £17	20/- to 24/-
King Wm's Town	0 10 0	0 15 0	0 12 0	0 7 0	0 7 6	6 0	8 0	0 7 0	0 11 0	0 0 6	*0 6	*0 6	0 1 8	1 0	£15	28/-
Malmesbury ...	0 11 6	0 13 6	0 10 6	0 10 0	...	10 0	8 0	0 8 9	0 8 4	0 1 0	*†0 8	0 8	0 1 3	1/6 to	£16	23/6
Mossel Bay ...	0 10 0	0 15 0	0 18 0	0 15 0	...	4 0	10 0	0 9 0	1 1 0	0 1 0	*9d & †8d	*9d & †8d	0 2 0	2/-	...	...
Port Alfred ...	0 12 0	0 10 0	0 15 0	0 9 0	0 12 0	8 0	10 0	0 6 0	0 12 0	0 0 8	0 8	0 6	0 1 3	0 6	...	...
Port Elizabeth ...	...	...	...	0 6 0	...	...	...	0 6 6	1 0 0	...	0 4½	0 8	0 1 6	1 2	...	...
Queen's Town ...	0 6 3	0 18 0	0 6 6	0 5 8	0 5 0	6 3	5 6	0 5 6	0 18 0	0 1 6	*0 6	*0 8	0 1 6	1 0	£12 to £15	23/-
Tarkastad ...	0 13 6	0 15 0	0 13 6	0 10 0	0 12 0	10 0	...	0 9 0	0 12 6	0 1 0	*7d & †6d	*7d & †6d	0 1 0	1 0	£15	22/-
Vryburg ...	0 11 0	0 18 0	0 14 0	0 5 9	0 9 6	12 0	10 0	0 7 6	0 18 0	0 0 6	*0 10	*0 9	0 1 9	0 10	£13 10s.	20/-
Worcester ...	0 10 0	0 15 0	0 11 0	0 7 0	0 8 0	8 0	7 0	0 4 9	0 11 0	0 0 6	*8d & †7d	*8d & †7d	0 1 4	1 4	...	...

NOTE.—A blank space denotes "no transactions." * Colonial. † Imported.

DEPARTMENTAL NOTICES.

Application for the Services of Government Veterinary Surgeons.

It is hereby notified that as there are now several qualified Veterinary Surgeons in private practice in Cape Town and its vicinity, Kimberley, and Port Elizabeth, the services of Government Veterinary Surgeons in these places will be available only in cases where an animal is suffering from a contagious or infectious disorder, or in cases which are, on other grounds, of public interest and importance

Farmers and owners of stock throughout the Colony frequently telegraph for one of the Government Veterinary Surgeons to be sent to attend to some valuable animal which has been taken seriously ill It is rarely possible to comply with these requests at once, in the first place, because it is seldom that the Veterinary Officers can be communicated with immediately by telegraph, as they are generally engaged in the country at some distance from a telegraph station, and in the second place, because the only Veterinary Officer who may be at liberty to leave the work upon which he is engaged at the time may be at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any real service in an urgent case Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the Veterinary Staff discredited It would be much more satisfactory therefore in all cases in which veterinary advice and assistance are required, if the owner would telegraph to "Veterinus," Cape Town, with prepaid reply the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible This would enable the Chief Veterinary Surgeon to telegraph advice at once, and state whether he were able to arrange for veterinary attendance on the case or not, and thereby save valuable time which is always of importance in acute and urgent cases

It must however, be clearly understood that, as this arrangement is intended purely for the benefit of farmers, the Government cannot accept any responsibility whatever, pecuniary or otherwise, for any loss of stock, etc, which may result from the treatment or advice of any Government Veterinary Surgeon

Applicants for the services of the Government Veterinary Surgeons must, at their own cost, provide the necessary transport for the conveyance of these Officers from and back to their residences or nearest Railway or Post Cart Station

D Hutcheon,
Chief Veterinary Surgeon

Veterinary Branch,
Department of Agriculture, 24th September, 1905.

List of Cape Government Veterinary Surgeons

Stations	Names
Beaufort West	Mr. S. Elley, M R C V S
Cape Town	Mr J. H. L Lyons, M R.C V S
Cape Town	Mr C. Goundry, M.R C V S
East London	Mr R W. Dixon, M R C V.S.
Elsenberg (Mulder's Vlei)	Mr R. Paine, M R.C V.S
Grahamstown	Mr T Bowhill, F R.C.V.S.
Grahamstown	Mr. J. Spreull, M.R C.V S.
Kokstad	Mr M. A Hutchence, M R C.V.S.
Mossel Bay	Mr J. A. Robinson, M R C V S.
Molteno	Mr. W G Pakeman, M.R C.V.S.
Somerset East	Mr J D Borthwick, M R.C.V.S.
Uitenhage	Mr G. W. Freer, M.R.C V.S.
Umtata	Mr. P. X. Kearney, M R C.V.S.
Vryburg	Mr. J. Neill, M R C.V S.
Worcester	Mr. A. Goodall, M.R C V.S.

Free Carriage of Cattle and Ostrich Dips.

It is hereby notified for general information that the undermentioned Cattle and Ostrich Dips will be carried free to purchasers thereof on the Cape Government Railways and by road, subject to the conditions specified in the subjoined Schedule.

D. Hutcheon,
Acting Director of Agriculture.

Schedule of Conditions.

1. The Dip must be carried from the nearest Railway Station or Port, as the case may be, or otherwise by the usual trade route serving the locality in which the purchaser resides.

2. The Railage and road carriage, the cost of which will be borne by the Government, will be for the *forward* journey only, *i.e.*, from the nearest Railway Station or Port, or the usual trade route, as the case may be, to the purchaser's farm. No cost of the *return* journey or any part of it will be borne by the Government.

3. On delivery to the Civil Commissioner of the Division of the Railway consignment note or the receipt for transport, or both, and on presentation to him of the seller's invoice or receipt for any of the undermentioned Dips, a refund will be made to the consignee of the railway or transport charges, or both, paid by him.

4. The Railway charges to be refunded will be at the third-class rate.

5 The transport charges shall not exceed those usually made to the general public.

6 The following Cattle and Ostrich Dips have been accepted as effective Tick-destroying preparations for the purpose, and within the meaning of these Regulations, and no other Dip will be recognised as an effective Tick-destroying preparation until a sample is supplied for analysis and a test of its practical efficacy has been made in the presence and to the satisfaction of a Government Veterinary Surgeon, viz.:—

Alderson's Cattle Dip.
Cooper's Cattle Tick Dip.
Demuth's Cattle Dip.
Fletcher's Albany Tick Dip.
Hayward's "Fluid" Dip and Cattle Wash
Little's Cattle Tick Dip.
Quibell's Paste Cattle Dip.

Warning.—Poisonous Plants in Oathay.

It having been brought to the notice of the Agricultural Department, and established beyond doubt, that several valuable horses—more recently in the district of Kimberley—have died from eating the plant "Ornithogalum Thyrsoides," locally known as "Chincherinchee" or "Violjee," which was found mixed in bales of Forage coming from the Western Districts of the Colony, the Public are reminded of the fact that the plant in question is of a very poisonous nature.

Both Forage Growers and Forage Dealers would therefore be well advised to carefully consider the danger to which they are exposed by reason of this poisonous weed being left in the forage sold, and the liability of the seller for any damage which may result therefrom when fed to animals.

D. Hutcheon,
Chief Veterinary Surgeon.

Introduction of Swine into Transvaal and Orange River Colony.

It is hereby notified for the information of the public that, in order to comply with the regulations published by this Department's Notices Nos. 6 and 7, dated 10th July, 1905, governing the introduction of Swine into the Transvaal and the Orange River Colony respectively, it will be necessary for owners of pigs to have the certificate referred to therein first signed by a Resident Magistrate, Field-cornet, Justice of the Peace, or duly qualified Veterinary Surgeon, before submitting it to this Office for counter-signature

D. Hutcheon,
Chief Veterinary Surgeon.

Ports of Entry for Live Stock from the Transvaal.

The following proclamation, No. 325 of 1905, is issued by His Excellency the Governor:—

Whereas it has been shewn to me to be expedient to restrict the introduction of Livestock, the importation of which into this Colony from the Transvaal is now or may hereafter be regulated, to certain defined Ports of Entry on the Cape Colony—Transvaal Border:

Now, therefore, under and by virtue of the powers and authorities in me vested by the 6th Section of the Animal Diseases Act No. 27 of 1893, I do hereby proclaim, declare and make known that, from and after the date of the publication hereof, the introduction of Livestock into this Colony from the Transvaal, the importation of which is now or may hereafter be regulated and controlled, shall be permitted only through the Ports of Entry established at Malmani Road, Myssymiyani and Fourteen Streams, on the Cape Colony—Transvaal Border.

Ports of Entry into Orange River Colony.

The subjoined further amended list of Ports of Entry for Livestock from the Cape Colony into the Orange River Colony, together with the conditions imposed by that Colony, is hereby published for general information, and will replace my notice No. 8, dated 13th July, 1905.

D. Hutcheon,
Chief Veterinary Surgeon.

Office of the
Chief Veterinary Surgeon,
Cape Town, 7th September, 1905.

Ports of Entry for Live Stock.

1. Frere Road Bridge.
2. Bethulie Road and Railway Bridges.
3. Norval's Pont Railway Bridge.
4. Colesberg Road Bridge.
5. Dalton's Pont on the farm Welgedraai, Division of Fauresmith.
6. The farms Ramah } in the Division of Jacobsdal.
7. Karreelaagte, }
8. Schultznek.
9. The farm Rosebery Plain (Welgevonden), for the Division of Kimberley.
10. The farm Rietpan. }
11. The farm Charlottesdal and } for the Division of Boshof.
12. Smith's Kraal, }

REGULATIONS.

1. Orange River Colony Ordinance No. 52, of 1903, and Proclamation No. 3, of 1904, prohibit the introduction of any horse, gelding, mare, colt, filly, donkey, mule, bull, ox, cow, heifer, calf, or ostrich into the Orange River Colony, unless the owner shall have first obtained a certificate as hereunder set forth.

2. The certificate necessary before any of the above-mentioned animals can be permitted to enter the Orange River Colony is that set forth in Annexure "A" hereto. issued and signed by the Resident Magistrate, Justice of the Peace, Field-Cornet, Veterinary Officer or Inspector of Sheep of the District in the Cape Colony from which such animals have come.

3. The person in charge of such animals is liable to be called upon to produce the certificate aforesaid to the Inspector of Stock at any of the Ports of Entry abovementioned, or any Justice of the Peace, Police Officer, or owner of land over which such animals may pass or may be passing.

ANNEXURE "A."

I.................................... do hereby certify that the animals herein specified (horse, gelding, mare, colt, filly, donkey, mule, bull, ox, cow, heifer, calf, or ostrich) are free from infectious or contagious disease, and have not been in contact with infected animals, and to the best of my knowledge and belief have not come from or through a locality where any such disease is known to exist, viz- :—

Number and general description.
Place from which sent........... ...
Owner's Name and Address........

Name of Person in charge .. ..
Place in the Orange River Colony to which animals are sent....... ....
Signature of Resident Magistrate, Justice of the Peace, Field-cornet, Veterinary Surgeon or Inspector of Sheep of the District in the Cape Coleny from which such animals have come ....
Place.......................... ....
Date............ ....

PIGS (COLONIAL AND IMPORTED).

The introduction of Colonial-bred Pigs into the Orange River Colony from Cape Colony is regulated by Government Notice No. 7 of 10th July, 1905. Pigs imported into Cape Colony by sea, may be introduced into the Orange River Colony, provided that—

(a) Such Pigs are conveyed direct from the port of landing to the Orange River Colony in closed trucks, such trucks having been properly disinfected at the port of landing; and

(b) A certificate, signed by a qualified Veterinary Surgeon at the Port of landing that such Pigs were landed free from disease, and that the trucks in which they are conveyed were properly disinfected, accompanies each consignment and is produced at the Border Station.

SHEEP AND GOATS.

The removal of sheep and goats will be allowed only under the Cape Colony Scab Acts Regulations.

Codling Moth Prohibition.

The following Proclamation, No. 354 of 1905, was issued by His Excellency the Governor :—

Whereas there is reason to believe that the portion of this Colony lying East, and including the districts of Albert, Molteno, Tarka, Bedford, Albany, and Alexandria, is free from the insect pest known as Codling Moth (*Carpocapsa pomonella*) : and whereas it is expedient that the said area shall be protected against the introduction of the said pest : Now, therefore, under and by virtue of the powers and authorities vested in me by the 12th Section of Act No. 29 of 1905, entitled the "Nurseries Inspection and

Quarantine Act, 1905," I do hereby proclaim, declare and make known that, anything to the contrary in any previous Proclamation notwithstanding, from and after the date of this Proclamation the Regulations set forth in the Schedule hereto shall be the Regulations for the prevention of the spread to the said area of the insect known as "Codling Moth."

Schedule.

1. The introduction, by land or sea, into that portion of this Colony lying East of and including the Districts of Albert, Molteno, Tarka, Bedford, Albany, and Alexandria, by any means and for any purpose whatsoever of apple, pear, or quince fruits in their fresh state or of receptacles in which any such fruit has been carried, is hereby absolutely prohibited. This prohibition, however, shall not affect the transport by rail of any such fruit or receptacle which passes into the defined area in transit to points beyond.

2. Any such fruit or receptacle introduced into the said area in contravention of the foregoing Regulation shall be liable to confiscation and destruction.

Destruction of Locusts.

It is hereby notified for general information that Government aid will be granted towards poisoning or spraying of Locusts, subject to the conditions specified in the subjoined Schedule·

D. Hutcheon,
Acting Director of Agriculture.

CONDITIONS OF GOVERNMENT AID.

Locust Boards.

1. The Resident Magistrate of the District will nominate a Locust Board, to consist of three persons for each Field-cornetcy, Municipality or Village Management Area

2. The duty of the Board is to arrange where pumps are to be used and to receive and determine upon applications for soap, etc., and to issue orders for the same, signed by the Chairman.

Spraying Materials.

2. Government aid will be given in respect of the following articles:—

(1) Blue Mottled Soap
(2) Sunlight Soap.
(3) Other cheap Soaps.
(4) Arsenite of Soda
(5) Spraying Pumps.

4. Directions for using soap spray and arsenite of soda—sugar spray are set forth in a leaflet, which can be obtained from the Locust Board.

Soaps.

5. Government will bear two-third of the costs of soaps purchased by applicants on orders signed by the Chairman of a Locust Board.

6. The cost of the soap must be the ruling market rate.

7. Storekeepers supplying soaps on orders of Locust Boards must render to the Resident Magistrate of the District their account for two-thirds of the cost, and to applicants direct their account for the remaining one-third cost. To the account rendered to the Resident Magistrate must be attached the order, which should bear the applicant's receipt for the soap.

Arsenite of Soda.

8. Arsenite of Soda will be issued by the Resident Magistrate free of charge to applicants in their own vessels in quantities of 10 lbs , on production of orders signed by the Chairman of the Locust Board. This will not, however, interfere with the discretion of the Magistrate, should he consider it necessary to issue arsenite without such an order

Pumps-

9. The use of spraying pumps can be procured on application to the Locust Board for such period as the Board may allow.

THE PRODUCE MARKET

CAPE TOWN.

Mr. R Müller supplies the following report for the month ending 20th October, 1905.—

Wool —Since my last report a considerable quantity of Wool has come forward, all lots meeting with very good competition Light Grassvelds and Bokveld Wools are in good request, and super clips of combing description reached up to 9¼d per lb Long Malmesburys of good quality and light condition may be quoted from 7⅜d to 8 d Short and inferior from 6⅞d to 7½d, Long light Karoos from 6½d to ⅜d On the 16th of last month a Sale was held at Darling which was attended by all the Cape Town buyers The prices for the chief lots of Long ranged from 9⅛d to 10d, Medium length brought from 8⅛d to 8¾d, Bellies from 5½d to 6⅜d, and Locks and Pieces up to 4⅜d per lb The highest price, viz, 10d, was paid for the clip belonging to Mr F Duckitt Waylands This gentleman deserved every credit for the way in which he had sorted his Wool

	s.	d	s.	d		s.	d.	s.	d
					Short and Inferior ..	0	4	0	5¼
Super Long Grass Veld Wool	0	8	0	9¾	Wool for Washing ..	0	4½	0	6½
					Snow white Super to Extra	1	7	1	10½
Super Long Karoo Veld Wool	0	6¾	0	8	Ordinary	1	2	1	7
Medium Karoo Veld Wool	0	5	0	6¼	Fleece Washed ..	0	9	0	10

Mohair The market is firm and reports from Home continue to be satisfactory The yarn trade appears to be in a healthy condition, and it is quite possible that prices may harden in the near future A fair amount of business has been done on the basis of about 15d for good Long Firsts Winter about 1s, Winter Kids 1s, while Summer Kids may be quoted at 18d

	s	d	s	d		s.	d.	s.	d.
Mohair, Firsts, Summer	1	0	1	3	Mohair Winter ..	0	10	1	0
,, Kids.. .	1	3	1	6	,, ,, Kids..	1	0	1	3
,, Seconds ..	0	6½	0	9½					

Ostrich Feathers —A fair amount of business has been done The market remains without much quotable change Pluckings of good average quality are in good request, and especially broad goods are realising good prices

	£	s	d	£	s	d		£	s	d	£	s	d.
Super Primes	10	10	0	35	0	0	Floss ..	0	5	0	1	10	0
							Long Drabs ..	2	10	0	4	10	0
Firsts, Ordinary to Super ..	8	0	0	10	10	0	Medium Drabs .	1	5	0	1	15	0
Seconds ..	6	0	0	8	0	0	Short to Medium	0	10	0	1	10	0
Thirds ..	3	10	0	5	0	0	Floss ..	0	2	6	1	10	0
Femina (super)	7	0	0	10	0	0	White Tails ..	1	5	0	1	15	0
							Coloured Tails..	0	5	0	1	10	0
Femina, Seconds to Firsts ..	4	0	0	6	10	0	Chicks ..	0	1	0	0	2	0
Byocks (fancy) ..	5	0	0	7	10	0	Spadonas ..	2	10	0	4	0	0
Long Blacks ..	4	10	0	7	10	0							
Medium Blacks	3	0	0	3	10	0							
Short to Medium	0	10	0	2	10	0	Inferior Black & Drabs, Short to Long ..	0	0	6	1	10	0

Skins and Hides —The Market remains unchanged All classes are in good request

PORT ELIZABETH

Messrs. John Daverin and Co, report under date, October 20th 1905:—

Ostrich Feathers —Owing to Monday being a holiday, there were no sales held this week There has been a moderate business done out of hand at full current prices

	£	s.	d.	£	s.	d.
Primes : Extra super				Special Prices.		
Good to super	8	10	0	12	0	0
Whites : Firsts	6	10	0	8	10	0
Seconds ..	4	0	0	5	15	0
Thirds ..	2	10	0	4	0	0
Feminas : Tipped and Grey ..	4	10	0	7	0	0
Seconds ..	2	10	0	4	0	0
Thirds ..	1	10	0	2	10	0
Fancy ..	4	0	0	6	0	0
Tails ' White ..	1	5	0	2	10	0
Light ..	0	17	6	1	5	0
Coloured & Dark	0	5	0	0	12	6

	£	s.	d.	£	s.	d.
Blacks : Long ..	3	0	0	4	10	0
Medium ..	1	5	0	2	10	0
Short ..	0	10	0	0	15	0
Wirey ..	0	1	0	0	1	6
Floss ..	0	6	0	1	5	0
Drabs : Long ..	1	10	0	2	10	0
Medium ..	0	12	6	1	5	0
Short ..	0	2	6	0	6	0
Wirey ..	0	0	6	0	1	0
Floss ..	0	6	0	1	5	0
Spadonas : Light	2	0	0	3	10	0
Dark ..	0	12	6	1	12	6
Chicks ..	0	0	3	0	1	6

Wool.—This market continues active, and a good business has been done in the open market during the week. On the public market yesterday, only a small quantity was offered, prices showing no change.

Snowwhite Extra Superior ..	20d	20½d
Snowwhite Superior ..	17½d	19d
Do Good to Superior	16½d	17d
Do Inferior Faulty	15½d	16d
Grease, Super Long, well-conditioned, Grassveld grown (special clips)	8d	9d
Grease, Super Long, well-conditioned, Grassveld grown ..	6¾d	7¾d
Grease, Super Long, well-conditioned, Karoo grown (special clips)	7½d	8d
Grease, Super Long, well-conditioned Karoo grown ..	6¾d	7¼d
Grease, Super Long, we - conditioned, Mixed Veld ..	6½d	7d
Grease, Light, faultless, medium, Grassveld grown.. ..	6d	6¾d
Grease, Light, faultless, medium Karoo grown	6d	6½d
Grease, Light, faultless, short Karoo grown	5¾d	6¼d
Grease, Short, faulty and wasty ..	4¾d	5¼d
Grease, Coarse and Coloured ..	5⅜d	5⅜d
Scoured, Coarse and Coloured ..	6⅛d	10⅛d
O R. C. Grassveld Grease, long and well - conditioned (special clips) ..	7d	8d
O R. C. Grassveld Grease, long and well-conditioned ..	6¾d	7¼d
O.R.C. medium grown, light, with little fault	5¾d	6¼d
O.R C. short, faulty and wasty .	4¾d	5¼d
O.R.C Karoo grown, long and well-conditioned ..	5¾d	6¼d
O.R C medium grown, light, with little fault	5¼d	5¾d
O R C. short, faulty and wasty ..	4¾d	5d

Mohair.—This market remains steady, and several sales of Summer Firsts and Kids have been made at 15d and 18d The demand for Winter Hair has eased off a little, but we think this only a temporary lull. The demand for Winter Kids remains firm at 15½d Our cable received this morning reported a sale of Summer Kids at 20d, with a very firm market On the public market on Tuesday a fairly large quantity was offered to active competition, the bulk being sold at full current prices,

Superior Firsts special clips	15d
Ordinary Firsts .	14d to 14½d
Long Blue O.R C. Hair	14½d to 15d
Super Kids ..	18d
Ordinary Kids ..	16d to 17d

Mixed Hair ..	0s	11d	0s	12d
Seconds and Grey ..	0s	8½d	0s	9½d
Thirds . ..	0s	6d	0s	6d
Winter	0s	12¼d	0s	12 d
Do. Kids ..	0s	15d	0s	15½d

Skins.—Sheepskins sold in bundles at 7d per lb.; Pelts at 4¼d; Capes, 1s 10d; damaged, 6d each; Angoras, 7¼d; Shorn, 4¾d; damaged, 3½d; Goat, 11¾d; damaged, 6d per lb; Springbok, 8d each.

Hides—Sun-dried Hides sold this week at 7½d; and damaged, 5¾d; Drysalted, 6¾d; damaged, 5½d, and thirds, 3½d.

THE

Agricultural Journal

OF THE CAPE OF GOOD HOPE.

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All communications should be addressed :
"The Editor, Agricultural Journal, Department of Agriculture, Capetown."
Telegraphic Address : "Bulletin," Capetown.

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NOTES.

Agricultural Show Fixtures.

A fairly complete list of fixtures for the approaching show season is published in this issue, from which it will be seen that the exact dates for Grahamstown and Queenstown have still to come. February will be a very busy month. Ceres and Malmesbury, it will be noted, have appointed the same date; while Queenstown, Rosebank and King William's Town threaten to overlap. It is a pity that the Agricultural Union omitted to fix the dates this season, and thus have obviated the overlapping and duplication which now threatens. Barkly East, we are informed, is also coming into the list, but no date has been fixed as yet. This Society intends putting forward a prize list of £560, irrespective of three silver cups valued at £30, £10, and £5 each.

Back Numbers.

We have again to thank those of our readers who so kindly forwarded copies of the issues of the *Agricultural Journal* (English edition) for March, June, July and August of this year. We still have enquiries for more of these copies, and if any one has duplicates they would greatly oblige by forwarding same, marked "O.H.M.S." (when postage will not be charged) addressed to The Editor, *Agricultural Journal*, Department of Agriculture, Cape Town.

We have also to crave the indulgence of a large number of would-be readers of this publication. When new names are sent in for the mailing list, it is not always possible—for various reasons—to forward them copies of the issue immediately following. There have been some disappointments lately, which we regret exceedingly, but the demand for the *Agricultural Journal* remains so strong that it is difficult to keep pace with it.

Cape Brandy in England.

Enquiries having been set afoot by the Commercial Agent in London (Mr. Lewis Atkinson) with regard to the probable market there for Cape Brandy and spirits of wine, one of the largest wine and and spirit houses in London gave the following information:—"All the samples appear to be of good quality, and to have been carefully distilled. With regard to placing a good Cape brandy on this market, we are afraid that the chances of success would be remote, as the brandy trade in this country is almost entirely monopolised by France. Some years ago we tried to put on this market a fine Spanish brandy from the Jerez district, at the time when many of the best vineyards were destroyed by phylloxera. We were not, however, successful, and we very much doubt whether it would be possible for any firm to recoup themselves if they took up the sale of Cape brandy. There would be no market in this country for your brandies, as the public require their brandy from Cognac, and will at times even put up with an inferior article provided it is guaranteed to be shipped from that district. In recent years the Cognac District has been making great strides, and many of the old vineyards have been replanted."

Irrigation.

Mr. C. E. Lawford, Civil Engineer, of Mortimer, district Cradock ("Apex") writes :—The Irrigation Bill of last Session is sure to crop up again. In fact, it is stated, it would have passed had it not been for the strenuous opposition of the Oudtshoorn farmers. If this is so, then the country generally, and the landowners in particular, owe these farmers a debt of gratitude for shewing their foresight with such good results. In the September number of the *Agricultural Journal* was an account of how they manage to irrigate on a large scale and generally agree among themselves as to the division of the water, without going to law, and their experience bears out that of other free countries, viz., that *the line of least resistance* in this *intricate* problem of irrigation lies in apportioning the waters on each stream ourselves. Mention has already been made of what appears to me as the first step, or most general want in this matter, viz., skilled advisers. A second want, not quite so general, but just as pressing, is *cheap money*. Let the Government lend on business lines. If a business man would lend, let the Government do so on equally good security, but at cost price to either individual or co-operative operators, and let the Government shew the right way by appointing scientific agriculturists in charge of irrigation farms.

It should be laid down as an inviolable rule that *each large main stream has its own experimental irrigation farm*, where farmers can see for themselves the results of experiments. "Seeing is believing" and the farmers' opposition to things scientific will be more easily got over by what they see than by what they are told. It has been the penny wise and pound foolish policy of our past Governments in employing low salaried advisers, which has brought engineers and other scientific men into such bad repute in this country. Really good men are always worth their price, and if we won't pay them other States and countries will; while we blunder on with our failures at great cost to the taxpayer. A few really first-class men (irrigation engineers and scientific agriculturists), well paid, given a free hand, and made to understand that they will be judged by the results of their actions, would shew excellent and almost immediate returns on investments; and this is what we want, for we cannot afford to wait years for the maturity of the big undertakings. We need the carrying out of the smaller ones in hundreds to-day, and in twelve months they will commence to give returns.

A shrewd farmer, starting on an undeveloped farm, with insufficient capital, would, after considering all desirable improvements, carry out first such of them as would give the quickest return on the outlay, and so "keep the pot boiling," and leave for later years such works as will yield profits only after long investment. Since money is scarce just now, not only with the farmer, but also with the Government, both will do well to invest on these lines in their irrigation enterprises. A question farmers should ask themselves is: Do they really want a *comprehensive* Irrigation Act, which must be of necessity a leap in the dark? If we are as good at self-help as the Oudtshoorn farmers, it is evident we can carry on lots of irrigation without anything further in the way of *law,* for they have done well under existing circumstances, and it is at least an open question whether they would have done as much had this last Irrigation Bill been on the Statute Book for the last ten years. But doubtless their record would have shewn even greater success had *cheap money* and *skilled advisers* been ready to their hands. Would it not be well before springing more laws on us, especially without notice, and always without sufficient time to well consider the subject; to take some trouble to find out what is really required. Let the facts be studied first and the subject thoroughly thrashed out on all sides. We will then know whether it is the want of *more law* which is holding us back so seriously or the want of *cheap money and sound practical scientific advice.*

The George Farmers' Association.

We have received from the energetic hon. secretary (Dr. Robert A. St. Leger) a copy of the first annual report of the George Farmers' Association. It must be very gratifying to all concerned to be able to put out such an excellent record of progress. The Association numbers 112 members and monthly meetings have been held during the whole of the year. Four morgen of ground have been secured from the Town Council for show purposes and this has been planted and fenced in. Great work has been done in the direction of forwarding the railway scheme for the District; and the Association met His Excellency the Governor on the Oudtshoorn border during his visit in June, presented an address and provided a body guard which escorted His Excellency right through the district. The Co-operative Expert has been met and plans are now being discussed by a special committee with a view to the application of co-operative principles by the Association. Improved marketing facilities, among other matters, have engaged the attention of the Association and altogether a busy and useful year may be looked back upon. So comprehensive and interesting a programme should give courage to other Associations and help them with ideas for future work.

Colonial Fruit Show in London.

Our attention has been directed to a literal error which appeared in the October issue in connection with the dates fixed by the Royal Horticultural Society for the Show of Colonial Fruits in London. We then announced that the series of shows was to be held as follows: "On December 5th and 6th 1905, to be followed by others in March, May and December, 1905." Of course the latter date should have been 1906. The error is so obvious that we cannot realise anyone being seriously misled by the mistake.

Stud Stock for the Orange River Colony.

Those breeders who forwarded their names in connection with the recent notification as to the purchase of stud stock by the Orange River Colony may expect the delegates very shortly. Owing to the number of names sent in, the itinerary of the delegates will have to cover the better part of a month. Full particulars have been forwarded to Bloemfontein as to the easiest way of visiting the various places and so soon as a time table has been prepared all interested should be notified as to when they may expect the delegates.

To Agricultural Societies, Farmers' and Fruit Growers' Associations, etc.

The Acting Director of Agriculture will be pleased to be favoured with the agenda papers of all Agricultural Societies, Farmers' and Fruit Growers' Associations, and other bodies interested in the development of agriculture in this Colony. The object is to render assistance where such may be required by offering information on subjects that may come up for discussion, or by deputing officers conversant with such subject to attend the meetings of the bodies mentioned when opportunities occur therefor.

More Shropshires.

Messrs. Cooper and Nephews have imported some more Shropshire sheep just recently, a shipment of rams and ewes being landed at East London from the s.s. *Amatonga*. The sheep came from the firm's English flocks, and were imported for two well-known farmers in the Orange River Colony. Some of the rams are to be used for crossing on merino ewes with the object of raising early fat lambs for the butcher. This breed of sheep is growing in popularity in all sheep countries, as the cross-bred lambs mature extremely early and what is perhaps of more importance, Shrop-Merino wool always commands good prices.

Inter-Colonial Agricultural Union.

The first annual conference of delegates to the Inter-Colonial Agricultural Union, which took place at Maritzburg, Natal, during the closing weeks of October, is reported in another part of this issue. From the report it will be seen that the proceedings were not only interesting, but should ultimately prove of some value to the whole of South Africa, for many of the more important questions debated must come to the front in the not distant future. But first as to the Union itself, it is gratifying to note that a most businesslike attitude was taken up from the beginning. It will be recollected that when the preliminary meeting was held at Pretoria last year, when the Union was finally brought into being, the programme put forward seemed of a somewhat ambitious nature. After a year's experience this has been considerably modified and a scheme of working adopted which promises to give fair results and at the same time assist the Union to build up its strength.

Whatever differences of opinion may exist as to the utility of the various organisations which represent agricultural opinion in South Africa at the present moment, there are none as to the pressing necessity of an Inter-Colonial body of a federal nature which can meet at regular intervals and discuss matters of general interest from every standpoint. A good deal was said by various speakers at Maritzburg of the value of unity, but we believe that as much good will ultimately come of such meetings from the fact that men from different sections meet and exchange ideas as from any other source. At Maritzburg, Cape farmers from the Western, Midland, and Eastern Provinces rubbed shoulders with those from the Transvaal, Orange River Colony and Natal. And when one comes to think what that means in the matter of diversity of interests and diversity of methods, it is at once apparent how great an advantage it is to those delegates who went and also to the districts that sent them; for it is impossible that they should have seen and heard so much without carrying back some information of interest to their neighbours. The conference also proved of great advantage to the technical and professional members who were thus enabled to meet many of the officials of the Natal Government who are carrying out most important works and by seeing the methods they employ inform themselves as to the most suitable means of attaining certain given ends.

Central Veterinary Laboratory.

Among the many important subjects discussed, none will take higher rank than the proposal to establish a Central Laboratory for the investigation of Stock Diseases. The scheme outlined by Mr. Watkins-Pitchford, is undoubtedly the only one upon which such a laboratory could be set up and worked with any hope of satisfactory results. It is pleasing to see that he had the courage to place the whole case in its true aspect, and insisted that whatever is done provision must be made at the start for at least five years' work, and if possible ten. In other words all the governments joining the movement must be prepared to guarantee their share of the expenditure at once and not leave it to the risk of an annual parliamentary vote. But on the other point upon which the same speaker seemed to be rather strong, that was the complete independence of the director of such an institution, it will be noticed that Mr. Hutcheon, the Acting Director of Agriculture of this Colony, was not prepared to go so far. As Mr. Hutcheon, has had as much experience of the work of disease investigation as most men in South Africa, it is highly probable that his views on this particular point will have some weight. The exact line he took up was that while having no personal objection to the perfect freedom advocated by Mr. Pitchford, he believed it would be better in the interests of the movement to have some kind of a committee of an advisory and controlling nature. It would certainly do much to maintain interest in the movement, and this would be an essential point as such an institution is not wanted merely for the time being, but for all time.

Dipping and Ticks.

Another most interesting debate was that which was raised on ticks and dipping. The tick is a very real trouble to the Natal farmer. Like the poor he is always with them, and it was very gratifying to hear them state how successful they have been in reducing the ravages of this pest by dipping. If this can be done in Natal where ticks are far more plentiful than they are with us in the Cape Colony, there is every reason for our stock farmers to take their courage in both hands and continue the crusade with intelligent energy. We are aware that the theory that it is possible to exterminate ticks if only sufficient time, patience and energy are put into the work, is still unwelcome to many. But every day brings its practicability nearer — imperceptibly perhaps, but none the less nearer for all that. In fact we fully believe that before very long, when the full value of regular dipping comes to be more generally appreciated, it will be part of the cardinal belief of every energetic farmer that the tick must go.

Experimental Farms.

Among the many courtesies lavished upon the delegates of the Agricultural Union by the people of Natal, was the pleasure of a visit to the newly established Experimental Farm and Agricultural School at Cedara, a few miles north of Maritzburg, and the Experimental Station at Winkelhurst on the South Coast. The former is a fairly large proposition and in time will include a great deal of farm work of various kinds. At present everything is in the development stage, but much of interest is to be seen. The farm, which is under the charge of Mr. Pearson, is laid out as follows:— Afforestation, 1,350 acres; ordinary pasture, 852 acres; ordinary revenue crops, 500 acres; model farm, 300 acres; experimental pasture, 270 acres; experimental orchards 140 acres; experimental plots, 100 acres; forest nursery, 8 acres; botanical gardens, 5 acres, sewage beds, 5 acres; reservoir, 40 acres; buildings, roads, grounds, 43 acres—total acreage, 3,614. There are some excellent buildings for the farm work including good stables and stalls for cattle, a circular silo, and others. The agricultural school is just coming to completion and occupies the most striking position on the property. The dairy stock, under the charge of Mr. Challis, includes some fine Shorthorn and Devon stock—all imported, The forestry and orchard work is being carried out under Mr. T. R. Sim, Conservator of Forests.

The work at Winkelhurst is of a different nature altogether. Here the typical cultivation of the coast belt is more considered, including sugar, fibres, bananas, pineapples, cotton, and other semi-tropical products. Mr. Pearson showed some very encouraging manurial experiments with sugar which seem to indicate that much more can be done on the cultural side of this product than has been accomplished in the past. Altogether these little trips were exceedingly enjoyable.

Tea and Sugar.

But the most interesting of all, to the Cape delegates at least, was the trip to Stanger and the visit to the Umhlali Sugar Estate and Sir J. Liege Hulett's Tea Plantation at Kearsney. Here was something entirely new to all. They saw the huge fields of sugar with a certain degree of astonishment, and the enormous installation of machinery necessary to prepare it for market with ill-suppressed amazement. But when they had travelled some eight miles on the private railway belonging to the Kearsney Estate—a 30 in. gauge line—they were even more surprised to see the really grand scale upon which the Tea industry is carried out. There are hundreds of acres planted with tea, there is a huge factory in which hundreds of hands are employed, Indians for the greater part—and a new factory of even larger dimensions is just being finished. And to cap all, the hospitality of Sir Liege and Lady Hulett was beyond compare. Cape farmers should now take a personal interest in Natal tea and sugar.

Stud Book Registration.

Attention is directed to the advertisement of the Stud Book Association in the current issue. From that it will be seen that applications for registration in the Stud Book should be in by the 21st of this month to secure entry in the first volume which is to be produced at the beginning of the year. Application may be made for the entry of horses, horned cattle, merino sheep, Angora goats, Persian sheep, ostriches and pigs. All particulars are obtainable from C. G. Lee, the Organising Secretary at Klipplaat.

FARM AND VELD.

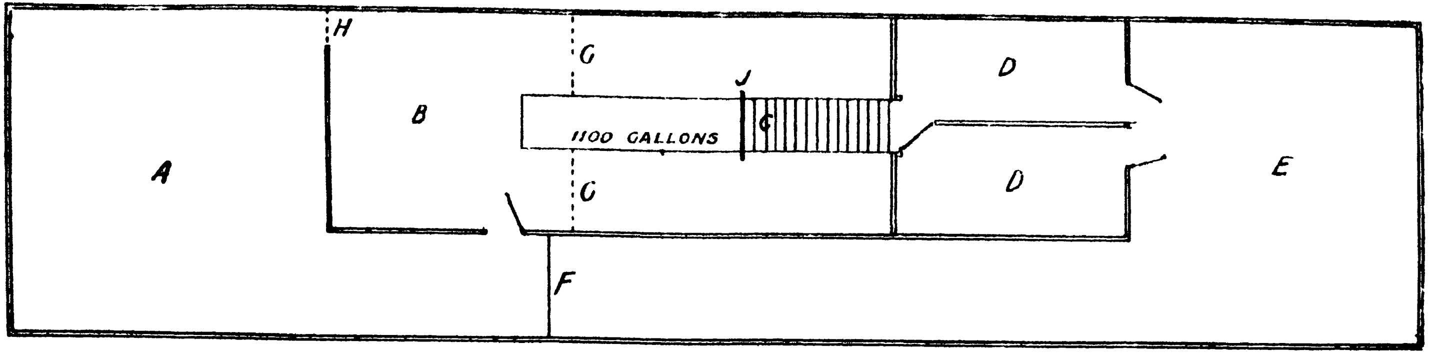
Re-stocking the Eastern Coast Belt.

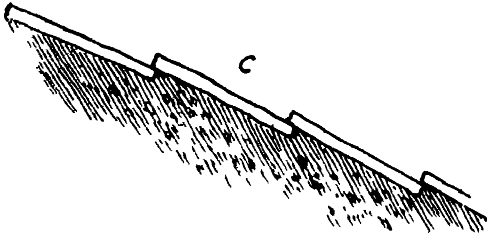
A correspondent, writing from the Coast belt towards the Alexandria Division, writes:—"An attempt has lately been made to re-introduce sheep to this part of the coast, and there are now some two thousand in the neighbourhood of Tankatara, divided amongst nine or ten farmers with varying success. I beg to ask whether you could do anything to encourage the farmers in the attempt. It might be of interest if an article on the attempt were compiled, and if the numbers of ewes and the surviving lambs of this season were noted. I daresay it has been ascertained from previous experiments, but as a result of the breeding which has gone on in this neighbourhood for three or four years, it is believed that cross-bred Persian merinos do not breed true, but become less Persian and more merino in each generation. From the results of my breeding I know that cross-bred ewes mated with a merino ram are not satisfactory at present on this farm, too large a proportion dying from heartwater. At the beginning of the season there were 175 ewes on my farm, and the number of lambs now living is 106. I mention this in case you should be interested, and wish for such figures. Another point of interest is whether the Persian Merino or the Persian Afrikander cross is the better for this district?"

Our correspondent's letter is very welcome, as it indicates the advance being made in the re-stocking of the Eastern Coastal Belt with sheep. From the information in our possession we believe it will pay much better in the end to breed from the Persian sheep as pure as possible, instead of crossing them with either the Merino or the Afrikander; because, although the latter may resist heartwater (the disease which kills off the sheep near the coast) a little better than the Merino, both these crosses take the disease—the Merino cross perhaps more than the other—due, probably, to the interesting fact mentioned, that the cross retains more of the Merino than the Persian. Persian sheep *do not possess an immunity from the disease.* They take the disease, but they have a strong natural or constitutional power of resistance which enables them to overcome its specific effects. It is this inherited constitutional resistance which becomes weakened by crossing with other breeds. It is, therefore, necessary, if the resistance is to be maintained, to breed as close to the true Persian type as possible in the heartwater belt.

Dipping for Scab.

Mr. Arthur S. Jackson, of Loxton, writes:—I was very pleased to read the letter by Mr. Louis Knoblauch in the *Agricultural Journal* of last month. He has hit the nail fairly on the head, but there is another nail in the coffin of the acaris that requires to be driven home, and that is, *the inadequate provision for efficient dipping apparatus on the farms,* and the Government are great sinners in that respect. Scab will not be eradicated unless there is a sufficient and efficient dipping plant on every farm. In my experience as Inspector for two years, and as Assistant to the Chief for a further period of two





A Kraal for flock to be dipped.
B Catching Kraal
C Long flat stones across with upper edge projecting about an inch or less.
D. Two Draining Kraals—more convenient than one.
E Kraal for finished flocks.
F. Wire fence showing so sheep can see through. There might also be a decoy kraal just there.
G. Walls or not, as convenient. I prefer none.
H Dummy Gate for leading goats and sheep to race to past end of dip.
J. Stop weighted to sink with three or four feet handle.

years, I found that on a large number of farms the dipping arrangements were very poor, and on many farms there were none at all, consequently, as it is necessary for thorough work to be done in scab eradication, an inefficient dipping plant should in no instance be tolerated by our Agricultural Department. But what do we find? In many instances the dipping tank is too small, the kraals inconvenient, the implements unsatisfactory, and consequently sheep are rushed through, or some get out and run away, or dipping is protracted to a late hour, and the scab acarus laughs (metaphorically) in its sleeve. What, then, is an adequate dipping plant? Let us have some sledge hammers to drive this nail,—some men with great experience to give us their ideas of an adequate plant.

1. Dipping tanks should not be too small, not anything less than about 1,000 gallons, with one stop at the end for small farms, otherwise the dippers get tired of the delay and sheep are rushed, often without stopping them at all.

2. Dipping tanks should not be too large, as that entails great waste of material for large farms—say 1,800 or 2,000 gallons, with two stops, or even three, so that 1,500 sheep could be done by, say 2 p.m.

3. Tanks should not be too narrow, as it is indispensable that the dipping fork holder should be able to keep the sheep moving, and this can only be done in a comparatively wide dip, 2½ to 4 feet wide.

4. The slope, I found most convenient, should be constructed of long flat stones, 6 or 8 inches wide, placed with their upper edges projecting beyond the one next above by from ½ to 1 inch, thus giving the heavy wet sheep a good grip with their feet. Smooth slopes and steps especially are very inconvenient.

5. Stops should be smooth on the catching kraal side, weighted to sink, and a strong, long, convenient handle, or else hinged, or made to slide.

6. Catching kraals should be comparatively small and close to the tank to obviate a long way for catchers to fetch the sheep.

7. Dipping hook, plunger and buckets, and adequate mixing apparatus, are indispensable. Odam's dipping fork is fairly good, but the ends curl up too far by about two inches, and the handles might be a shade thicker. A plunger should be strong, the handle long, and the blade, say a foot square.

8. Splendid buckets are made from paraffine four-gallon tins the handles of which are best set in, thus: Take a bit of bale iron strap, fold it double about two inches, punch a hole through both parts of the fold at each end forming a clip, fix your handle through the folded end, place the clips over the tin, one at each side; and place through the clip and the tin a small bolt half an inch long by ¼ thick. This handle will last years, and out-wear many paraffine buckets, being removed easily from one to another as they wear out.

The attached arrangement of complete dipping tank and kraals will illustrate the ones I have proved most convenient.

Weevils in Beans—Bean Bruchus.

A correspondent writing from George complains that all the beans planted or sown from August to December during the past two years have been infested with weevils and hundreds of bags lost. Beans sown from January onwards, if uninfested seed is used, are not affected. The weevils bore a hole from inside the bean and creep (as per sample forwarded). He asks for a remedy, as the pest is a great loss to the farming community there, and is calculated to hamper progress, more especially in bean culture.

This insect is the bean bruchus (*Bruchus obtectus*, Say.), a well-known pest of dried-beans that has earned a pretty bad name for itself in many widely-separated parts of the world. In 1899, Mr. Lounsbury's attention was directed to its presence in this Colony by Mr. M. J. B. Langfield, of Whittlesea, when he published an account of its life and habits in the *Agricultural Journal* of September 14th of that year. In that he says:—"The remedial measures of avail against the insect are the same as those effective for weevils in grain. Infested seed should be avoided. An easy way to sort out injured seeds is to throw the whole lot into water; those that have been damaged to any extent by the bruchus float while the sound ones sink. This plan has proved successful with all the kinds that I have examined, and I presume answers for any variety. If the beans are not intended for planting, the readiest way to destroy the insects in them in most instances is to spread the seeds after shelling out in the sun for a few hot days. Reliable farmers have told me that this measure is effective, and does not always destroy the vitality of the germ. Heating the seed in a kiln for several hours to a temperature of from 135 to 150 degrees has the same effect. An English writer of note has written that immersion of the seed in boiling water for one minute destroys an allied species of *Bruchus*; if the immersion of the seed is continued for four minutes, the vitality of the seed is said to be destroyed. Where beans are grown on an extensive scale, fumigation with the bisulphide of carbon, as often recommended for granary insects, is the cheapest and by far the most satisfactory remedy.

"The species of Bruchus with which we are at present concerned is not the common species that attacks the bean in Europe. It is very probable that this other occurs in the Colony, but thus far I have not heard that it has been found. There is a third species that is very injurious to peas in the same manner as the others are to beans. The last, the pea bruchus (*Bruchus pisi*, Linn.), occurs in the Cape Division. Unlike the bean bruchus, it does not ever oviposit on dry seed (as far as known), and therefore no living insects are found in old seed. Seed which has been infested and perhaps that still is infested is sold without restriction in Cape Town, and through this means the pest has not unlikely found its way into other districts. Until the adoption of systematic measures for its suppression, this insect for a number of years made the cultivation of the pea crop unprofitable in the greatest pea-growing districts of the United States and Canada. Carbon bisulphide fumigation is given as the remedy generally practised. The large growers have special buildings for the purpose, while the smaller farmers make use of old oil casks. To a cask that will hold five bushels, three ounces of the bisulphide are used; this is sprinkled over the seeds after the cask has been filled and the whole then tightly covered with damp bags held in place by boards. The operation is considered complete in two days."

Mr. Lounsbury now thinks that concerted action on the part of a community of farmers would be of great mutual advantage, as the pest seems to be growing. It would be interesting to learn through correspondence what steps are taken by our farmers to control this insect.

Locust Destruction.

No one means of locust destruction can be recommended for use under all circumstances, writes Mr. C. P. Lounsbury, the Government Entomologist, in a recent leaflet on the subject. It is sometimes practical to destroy the eggs; but in South Africa only measures against the voetgangers or hoppers are now generally employed. Ofttimes fire, applied in one way or another, is by far the best and cheapest means; at other times, trampling with sheep, etc., is best; at others, the use of screens with pits or traps; and at still others, spraying with a soap solution or an arsenical poison. The last means, spraying, is thought to be the most generally applicable measure where water is available, especially in grass country.

Soaps make the cheapest spraying solution known for killing locusts by contact. The breathing organs of the insects get choked. Blue Mottled and Sunlight brands appear to be of equal value, weight for weight, and doubtless other well-made brands are quite as good. The insects must be thoroughly wetted to get satisfactory results. The younger they are, the easier they are destroyed. In general it is not safe to trust to a weaker solution than one pound of soap to five gallons of water. If too much water is used, the locusts may be stupefied for an hour or two, but not destroyed. Some claim that spraying with soap in the morning is more effectual than spraying in the evening.

Arsenic acts as a stomach poison on locusts and kills them more or less quickly according to the strength at which it is used. It must always have several hours to work. The preparation issued by the Government is arsenite of soda. This is the chemical used in large quantities for the destruction of prickly pear; and it is the basis of all tick dips. In cold water it dissolves a little slowly; but in hot water it dissolves instantly, and thus a very concentrated solution may be easily made to be diluted when and where required. Many tons were used last year for locust poisoning in Natal and the Transvaal, and this measure for dealing with the pest is now preferred to all others in these Colonies. In the Transvaal a pound of sugar is used with each pound of the arsenite, and this amount of sweetening is deemed ample to attract the locusts. In Natal several times as much sugar is generally used. The poison is lightly sprayed around or over the swarms, or in front of them if they are on the move; generally it is applied in the morning or evening when they are at rest. The strength of the solution and the quantity applied is varied with the age of the locusts and other circumstances. In general, one pound of the arsenite to about ten gallons of water is used against nearly full-grown voetgangers, and one pound to twenty gallons against newly hatched ones, but where water is scarce the solution is made stronger and the spraying more lightly done.

The poison is deadly to all life. The vegetation soon withers where wetted, but stock should not be permitted to graze on the sprayed spots until after a good rain; the sprayed spots can be burned over in a few days especially during hot, dry weather. The greatest danger to stock, however, is found to be the leaving about of buckets containing the solution. Whole areas of crops should not, of course, be sprayed owing to the injury that would be done to them, but it pays well in some cases to spray small portions with the view of attracting or driving the locusts to those parts. In storing and handling the poison, its dangerous nature should never be forgotten. Some people find the solution to cause sores on the skin, and the natives employed in spraying by the Transvaal Government are given grease to rub over themselves as a measure of protection. The advantages of arsenical solutions over soap solutions for spraying are that the insects need not be wetted, and that much less solution need be used.

Spray pumps can be obtained on application to the Civil Commissioner of the district. With regard to Arsenite of Soda this is issued gratis in quantities of 10 lbs. Our readers will be interested to learn that in the Britstown district spraying is proving successful, several swarms have been completely wiped out by this means. The risk of being overrun with voetgangers therefore is considerably minimised.

Vomeerziekte, or Vomit Sickness in Sheep.

Mr. P. G. Marais, of Nieuwjaarsfontein, Mijnfontein Siding writes:—Under separate cover I am sending you a small plant known as the "Vomeer Bosch," which, I imagine, must be an irritant poison for it causes sheep to vomit very severely, which ultimately, as a rule, ends in death. Now, as many sheep are carried off yearly by this means, it would be a great boon, not only to myself, but to all sheep farmers, to know of some antidote by which sheep, suffering from "vomeer ziekte" might be saved. As death does not immediately result from the eating of the bush, the farmer has an opportunity of administering medicine.

On this subject Mr. D. Hutcheon, M.R.C.V.S., Acting Director of Agriculture, contributes the following notes:—"This is a peculiar disease which affects sheep in certain localities of the districts of Hope Town, Carnarvon, Victoria West, Kenhardt, Prieska, Britstown, and portions of the adjoining districts. The general opinion entertained by the farmers respecting the original cause of this disease—functional derangement of the stomach, or of the nervous centre which regulates the spasmodic movements involved in the act of vomiting—is that it is due to a certain bush known as the Vomeer boschje—*Geigeria passerinoides.** This opinion, has not as yet been verified by feeding experiments. In 1886 I fed some sheep with quantities of this plant obtained fresh from a farm on which the disease was prevalent at the time, but I failed to produce any symptoms of the disease, and Veterinary Surgeon Dixon repeated this experiment in 1899 with the same negative result. Since that date, feeding experiments with this plant have been conducted in the Beaufort West district by Veterinary Surgeon Elley, and also at the Rosebank experimental station by Mr. Robertson, at different periods and under different conditions—but always with negative results. It must be admitted, however, that this plant is generally found in considerable quantity on the veld where this disease is prevalent, and it may be that the poison is cumulative in its character, hence stock may require to feed upon it for a considerable time before it develops its physiological effects. A more recent opinion expressed is that the plant causes the disease only where grown on veld devoid of brak. It is very evident, however, that if this plant has anything to do with the origin of this disease, it must only be capable of exercising its peculiar action at a particular stage of its growth as the disease will suddenly cease, although the plant is abundant on the veld. Others say that the sheep eat it out when the veld is dry, and there are no other green bushes to feed on. Another opinion is that this disease is due to the sheep eating a quantity of sand in their efforts to get at the young grass which springs up after a rain in the Karoo districts. This sand, they say, accumulates in the bowels, or rather at the pyloric or bowel end of the stomach, and blocks up the passage. I was, however, unable to confirm this opinion by numerous *post-mortem* examinations. The immediate cause of death in the majority of the cases which I examined was Broncho-pneumonia, or inflammation of the lungs and bronchial tubes. The condition of the lungs is, however, a secondary effect of the primary irritation, and the vomiting which supervenes. If the affected sheep are watched, more especially when following the flock, it will be observed that when they cough and vomit, they make an effort at the same time to swallow the food brought up, and in doing so a certain portion passes down the trachea into the lungs, where it causes acute inflammatory action. There is no doubt about this, as portions of the vomited matter can easily be detected in the small bronchial tubes. I have little doubt also that this condition is greatly aggravated by driving the sick sheep with the flock, which increases the vomiting and distress very much.

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*The plant sent by Mr. Marais is the plant referred to.

"*Post mortem appearances.*—I made a *post-mortem* examination of several sheep in the early stages of the sickness, and found the lungs free from any appearance of irritation, nor was there any obstruction in the stomach or bowels, or accumulations of sand in any part of the intestinal tract.

"*Symptoms.*—The affected sheep walks behind the rest of the flock with a dull, tired, dejected appearance, and at short intervals it vomits. This spasmodic action is accompanied by a distressing sickly cough. There is not much food expelled from the mouth during the act of vomition, as the sheep makes an effort to retain it in the mouth and reswallow it. When very sick the sheep does not attempt to feed, but will lie down almost constantly if left undisturbed.

"*Cause.*—There is very little doubt that this peculiar affection is due to some nervous irritant which the animal eats. Whether it is the vomeer-bosje at present suspected, or some other plant, or some poisonous fungus that attacks certain plants at certain times of the year, which produces the physiological effects observed, I am unable to say; further experiments are necessary to determine these points.

"*Treatment.*—Many farmers successfully administer lye, a solution of the crude ash obtained from certain saline bushes, and used in the Colony for making soap. I have not experimented with this lye, but I have obtained very good results by giving:—

Bicarbonate of Soda	a dessertspoonful.
Laudanum ...	one to two teapoonfuls.
Water .	half a pint.

Repeat this dose morning and evening. A teaspoonful of lime is, perhaps, better than the soda salt. As soon as the vomiting has ceased, give a dose of purgative medicine to clear out the offending food from the digestive organs, such as three to four ounces of Epsom salts in half a pint of warm water. The affected sheep should not be allowed to follow the flock, but should be kept in a quiet place, and disturbed as little as possible. They do not want to eat, and in addition to the want of appetite, the stomach is much better to be kept undisturbed by any food until the irritation ceases.

EXTRA-TROPICAL FORESTRY.

Being Notes on Timber and other Trees cultivated in South Africa and in the Extra-Tropical Forests of other Countries.

By D. E, Hutchins, F.R. Met. Soc., Conservator of Forests,
Cape Town.

(*Continued from page* 446).

RHODESIA.

Climate.

Temperatures.—The plateau of Southern Rhodesia must be classed as extra-tropical, since, although lying within the tropics, its elevation and the constant play of cool winds from the ocean give it a mean temperature only a few degrees higher than that of Cape Town. The mean temperatures of Bulawayo and Sailsbury are estimated from existing data as 65° Fah. and Melsetter as 64° Fah. This may be compared with Cape Town, 62° Fah. (or 61° according to Stone's Tables); Johannesburg, 62°; and Durban, 70°.

	BULAWAYO (Hope Fountain), 1898-1904.			SALISBURY, 1898-1903.		
	Mean Max. deg.	Mean Min. deg.	Monthly Mean. deg	Mean Max. deg.	Mean Min. deg	Monthly Mean. deg.
Jan.	81·0	58·3	69·6	78·3	60·3	69·3
Feb.	79·4	58·1	68·7	76·9	59·0	67·9
March	79·3	61·2	70·2	77·3	58·6	67·9
April	74·0	55·4	64·7	77·0	55·0	66·0
May	74·0	50·2	62·1	73·5	48·3	60·9
June	68·1	43·4	55·7	68·8	44·2	56·5
July	69 4	42·2	55·8	69·2	43·3	56·2
Aug.	75·1	46·6	60·8	73·6	48·4	61·0
Sept.	80·7	52·5	66·6	78·4	51 6	65·0
Oct.	84·8	57·7	71·2	82 3	56·9	69·6
Nov.	83·8	60·6	72·2	79·9	60 2	70·0
Dec.	81·6	60 1	70·8	78·2	59·2	68·7
Year	77 6	53·8	65·7	75·9	53·7	64·7

MEAN TEMPERATURES AT MELSETTER FOR THE PERIOD 1899 TO 1904.

Monthly Means —Dry Bulb At 8 a m

	deg
January	68 5
February	65 9
March	65·8
April	64·0
May	58 5
June...	54 8
July..	54·6
August	59 6
September	63 5
October	68 2
November	70 6
December	68 7

Yearly Means

	deg
1899	61 2
1900	64·9
1901	63·9
1902	63 9
1903	64·3
1904	63·2

Yearly mean for the period 1899-1904—63·6°

For the altitude and latitude these are low figures. Easterly winds prevail throughout the year, interrupted only, for short periods, by the passage of weak depressions which bring rain in Summer. The climate of Southern Rhodesia may be said to be one of sea-breezes throughout the year, caused by the pressure of the South-east Trade, and the in-draught on to the heated Westerly deserts. The South-east Trade wind is too strong and the barometric depressions too weak to permit of hot winds off the dry country to the West and South-west. Rhodesia is thus freed from the hot winds which are so unpleasant and harmful a feature in the more Southern Colonies. The absolute maximum at Bulawayo in 1900, for instance, was only 87°.

The Rhodesian plateau is cooler than the Mexican plateau in the same latitude. We may say that 6,600 feet on the Mexican plateau corresponds with 4,000 or 5,000 feet on the Rhodesian plateau. The two following places in Mexico, though 1,500 feet higher than Bulawayo, have the same mean temperature. Leon, latitude 21°, elevation 6,000 feet, rainfall 36 in., has a mean temperature of 65° Fahr.; Queretara, latitude 20°, elevation 6,000 feet, rainfall 24 in., has a mean temperature of 65° Fahr. Again, Oajaca, latitude 17°, elevation 5,000 feet, rainfall 37 in., has a mean temperature of 67°, *i.e.*, 2 degrees higher than Salisbury, though it lies at the same elevation, and is barely 1 deg. of latitude nearer the Equator.

Salisbury is in latitude 18°, Bulawayo in latitude 20°. These low latitudes are practically equatorial. If the yearly insolation, or sun-power, at the Equator be called 347, then that in latitude 20° is 325 (Davis' Meteorology).

The forest vegetation of Rhodesia differs entirely from that of the Cape, and is generally related to the semi-tropical vegetation of the country north of the Zambesi, but the cold of winter and the occasional severe radiation frosts completely exclude all really tropical vegetation, except to a small extent on the eastern frontier. Near Melsetter is the remarkable Chirinda forest, a dense high-timber forest of indigenous species. There is said to be a patch of similar forest at Amatongas on the Beira railway and elsewhere along the strip of heaviest rainfall.

RAINFALL.

Hope Fountain, with a rainfall of 29 inches, may fairly be taken to represent the rainfall of the most southerly portion of the Rhodesian high veld, the rainfall at Bulawayo itself being slightly higher. Hope Fountain has complete records for the seasonal years 1888-89 to 1903-04, and below are the monthly and yearly rainfall figures for that period of 16 years.

A wonderful Avenue of Eucalypts at Altenroxel, N E Transvaal – trees 80 feet high at 5 years of age

Going north the rainfall increases. Salisbury has a mean rainfall (1898 to 1904) of 32·6 inches. On high ground only 12 miles from Salisbury the rainfall is more favourable, the rainfall, in fact, of a fertile country. It is only at Umtali and along the eastern highlands that the rainfall generally can be described as adequate, for

Forest destroyed and turned into Kaffir Mealie Gardens.

the latitude and for the rapid evaporation of a plateau country. At Umtali the mean rainfall is about 37 inches (1902 to 1904, three dry years 30·65 inches) and at Melsetter 44 inches (1899-00 to 1904-05). At Melsetter there is enough rain and mist in winter to allow of the regular production of crops of wheat (as along the eastern border of Orangia), while most of the valuable timber trees of Queensland flourish admirably. Along these eastern highlands of Rhodesia, the climate and flora differ widely from those of the dry plateau country of Rhodesia, that part which is ordinarily seen by the railway visitor.

MONTHLY AND YEARLY RAINFALL AT BULAWAYO (HOPE FOUNTAIN), FOR SIXTEEN SEASONAL YEARS.

Yearly Rainfall		Monthly Means	
1888-89	17 23		
89 90	43·01		
90 91	44 80		
91-92	30 08		
92-93	26 21	January	8 49
93 94	30 80	February	5 25
94-95	24 74	March	3·44
95-96	27 31	April	1·23
96-97	27 79	May	0 15
97 98	27·05	June	0 10
98-99	25 67	July	0·04
99-00	26 73	August	0 08
00-01	29 37	September	0·17
01-02	29 74	October	0·90
02 03	25·61	November	4·10
03 04	24 01	December	4·81
Mean	28 76		

Salisbury for Seven Calendar Years.

Yearly Rainfall.			Monthly Means.	
1898		21 74	January	7·97
1899		39·60	February	7·74
1900		42·62	March	5 24
1901		40·92	April	0 92
1902		27·33	May	0 21
1903		25·24	June	0·06
1904		30 65	July	0·00
			August	0 08
	Mean ...	32 59	September	0 56
			October	0 93
			November	4 50
			December	4 68

These figures shew that the Bulawayo rainfall culminates in January with an average of 8·5 inches. At Salisbury the rainfall is heavier than at Bulawayo, there being more rain in February and March. Salisbury has the usual distribution of summer rainfall in South Africa.

Melsetter may be taken as a typical rainfall in the fertile country along the Eastern border.

Mean Rainfall at Melsetter for the period 1899 to 1905.

Mean Monthly Rainfall	Inches	Yearly Rainfall	Inches
April	1 61	1899-1900	41·84
May	0 73	1900-1901	49·99
June	0·59	1901-1902	54·43
July	0·75	1902-1903	26·89
August	0 23	1903-1904	55 41
September	0·76	1904-1905	36·72
October	2·10		
November	5 83	Mean Yearly Rainfall	44·21
December	6 59		
January	10·83		
February	7·32		
March	6 58		

These rainfall figures at three typical stations shew that the Winter and Spring months, from May to October, are, on the average, practically rainless. It is the dry Spring, from August to October, that is to trees the trying feature of the climate of Southern Rhodesia. It is this that will throw out a large number of the finest trees in the world. Greece suffers from dry springs, the "April showers" of Western Europe not penetrating so far. The dry springs of Greece and the Eastern Mediterranean are hurtful to agricultural crops; but they do not injure trees with their deep roots and the ground still moist with winter rains. But the Rhodesian dry Spring comes after a dry Winter, and that is why it is so harmful to trees. I speak from experience of planting in a similar climate at Hanover, Cape Colony, where with a dry Winter and Spring there is a total rainfall of only 15 in.

On the Mexican plateau we see the same dry Winter and Spring, November to April (inclusive) being nearly rainless, while heavy rain falls from June to September. It is the Trade wind that brings the rain to both Mexico and Rhodesia.

The comparatively low temperatures and the absence of hot winds are the favourable features of the Rhodesian climate: the dry Spring is the unfavourable feature, to which, as regards vegetation, must be added the excessive winter radiation—the hot sun by day and the freezing cold nights.

In the Matopo Forest Nursery early in June, 1905, there were 10, 16 and 14 degrees of frost on three consecutive nights. The maximum shade temperatures on the same days were:—70°, 68° and 68° Fah. The actual temperature for vegetation in the sun was, of course, much higher. It is perhaps worth noting that for the same three days the minimum grass thermometer recorded sun temperatures of *103°*, of *85°* and of *98° Fah.* (Dowsitt).

SOME RHODESIAN HEIGHTS.

Rhodesian Plateau 3,000—5,000 feet.	Marandella	*5,600*	*feet.*
	Salisbury	*4,960*	,,
	Matopas	4,790	,,
	Plum Tree	*4,561*	,,
	Bulawayo Railway Station	4,460	,,
	Open country 55 miles north of the Zambesi Falls	4,000	,,
	Mazoe District (North of Salisbury)	3,000 to 4,000	,,
	Mangwe District (South of Matopas)	3,000 to 4,000	,,
	Old Umtali	3,705	,,
	Open country 45 miles north of the Zambesi Falls	3,080	,,
	Fort Victoria	3,380	,,
	Zimbabwe ruins	3,300	,,
	Francistown	3 254	,,
	Mochudi	3,105	,,
	Victoria Falls, Zambesi	2,850	,,
	Massikessi	2,800	,,
	Chimoia	2,400	,,
	Moodie's Drift over Sabi River, near Melsetter	1,820	,,
	Tuli	1,750	,,
	Zambesi valley, junction of Kafir River	945	,,

TREES FOR RHODESIA.

Nearly the whole of Southern Rhodesia is covered with an open forest of leaf-shedding hardwood trees. Of these hardwood trees, all but four are considered to be perishable. Borers are particularly abundant in Rhodesia, and attack most of the indigenous trees as soon as they are felled, riddling them with holes and rendering them useless except for firewood. The four durable indigenous woods that came under my notice when in Rhodesia are Teak (*Afzelia cunanzense*), Mahobo-hobo, Màngwe, and Mopàni. The indigenous forest of Rhodesia is that characteristic of what may be termed half-dry forest countries. It is more or less open, and the trees, though thick and often large and spreading, are short in the trunk. The best indigenous forest of this class in Rhodesia is the Teak forest near the Wanki coal-fields, west of Bulawayo. This forest is situated on poor open sandy soil, of little value for cultivation or pasturage, but well suited to tree-growth. It should be a cardinal point in the future administration of Rhodesia to so regulate the cuttings in the Wanki Teak forests that the forest is improved instead of being destroyed. This Teak forest would probably in itself be sufficient to supply all the hard wood required in the country. This so-called "Teak" has no botanical affinity with the Teak of commerce, *Tectona grandis*, but the wood has an appearance something like Teak, and it is usual, in new countries, to coin more or less appropriate names for the new trees. Rhodesian Teak is unfortunately harder and less easily worked than real Teak, which it cannot therefore really replace. According to my experiments Rhodesian Teak has an average weight of 60 lbs. per cubic foot, while the weight of real Teak *Tectona grandis*, is 40 lbs. per cubic foot. According to my experiments (see below under Afzelia) the transverse strength of Rhodesian Teak is P=669. Rhodesian Teak (*Afzelia cunanzense*) grows to a small tree, and forms approximately pure forest over considerable areas on soil so poor and sandy that it is of little use for agriculture. It is difficult to obtain straight balks of any length. The forest is described as being open and sparse, and regularly traversed by fire.

Nearly all the timber used in house-building in Rhodesia is imported at enormous expense from the forests of the Northern Hemisphere, and has to come 6,000 or 7,000 miles by sea, and then undergo a long carriage by land. Evidently, therefore, the class of timber required to be grown in Rhodesia is coniferous softwood. But White Ants in Rhodesia are nearly as troublesome as in the tropics, so that the timbers that should be grown should preferably be of the Cedar class, or other timbers, which, while being soft and easily worked, are at the same time repugnant to White Ants. *Cedrus deodara* is one such timber, and this valuable tree will no doubt succeed well in the cooler, damper portions of Southern Rhodesia. *Juniperus virginiana*, the Pencil Cedar, may be tried all over the country, and *Juniperus bermudiana* over a large portion of it, particularly the lower, better watered portions. About Umtali and Melsetter, where is the best tree-growing country, *Cedrela toona*, the Red Cedar of Australia, will probably be found to succeed, and with this probably also the more scented and durable *Cedrela odorata*. The Australian Cypress-Pines should flourish over a large portion of the plateau country. They are hardy, drought-resistant trees, the Cypresses of the Southern Hemisphere. Though usually small and slow-growing, they furnish timber that resists White Ants better than almost any other. The first two *Callitrises* that should be tried are *Callitris calcarata* and *C. robusta*. There are several species of *Callitrisses* in Australia, most of them growing on the drier inland plateau country, and all yielding softish, durable, more or less scented wood. *Callitris calcarata* and *C. robusta* are often richly coloured and figured, particularly the former. *Callitris whyteii*, the M'langi Cedar, flourishes in the Northern portion of Southern Rhodesia. Of the trees that have already been planted in Rhodesia little need be said. They have been planted haphazard; too often it has been assumed that because a tree would grow in Cape Town it should flourish in Rhodesia! Generally speaking, the opposite is the case, though there is a limited number of trees which will grow in both localities, and the native tree Dwadwa (*Faurea saligna*), is the Terblantz wood of Knysna and the Transkei.

An exception to this haphazard planting has been the excellent small plantation of Mr. W. H. Brown, near Salisbury. Here can be seen a vigorous growth of *Eucalyptus saligna*, *E. botryoides* and other Queensland trees. More recently (and guided, he is good enough to say, by my Matopa Report) Mr. Swynnerton, of Gungunyana, Southern Melsetter, has made some most successful plantations of forest trees. He says: "While *Eucalyptus saligna*, *E. botryoides*, and *E. globulus* have a somewhat more rapid growth than any of the others, *E. rostrata* and *E. siderophloia* of the same age are not far behind. For timber-planting, I at present certainly favour the last-named, together with *E. resinifera*, young trees of which are coming on rapidly; *E. saligna* and *E. botryoides* I am continuing to plant for shelter."

THE GUNGUNYANA PLANTATIONS.

At Gungunyana, Southern Melsetter, Mr. Swynnerton has obtained important results in experimental tree-planting. The climate here is one of the most favourable in Rhodesia. He estimates the normal rainfall of the district at as much as 80 inches. His farm is on the Chirinda hill, close to the remarkable Chirinda forest, and his timber plantations lie at elevations of 3,400 and 4,000 feet. The soil at the lower elevation is compact (schistose), at the higher it is composed of fertile loams and sand. But the lower elevation is sheltered while the higher is exposed to strong winds which have told on the tree growth.

Successful Eucalypts: 4,000 feet: Gungunyana.

Eucalyptus botryoides
" *crebra*

Eucalyptus robusta
" *ficifolia*

Eucalyptus rostrata
„ *salmonophloia*
globulus
citriodora
viminalis
cornuta
pilularis
„ *pellita*
„ *resinifera*
„ *diversicolor*

Eucalyptus amygdalina
„ *gunnii*
saligna
tereticornis
polyanthemos
piperita ?
paniculata
„ *siderophloia*
„ *marginata*
„ *microcorys*

The oldest of these trees, but planted only two years ago, now (November, 1905) shew the following growth :—

Average height-growth of 2-year old trees.

Eucalyptus	*globulus*	30 feet.
„	*botryoides*	30 „
„	*saligna*	30 „
„	*rostrata*	25 „
„	*siderophloia*	22 „
„	*robusta*	17 „
„	*marginata*	10 „
Casuarina	*leptoclada*	16 „
„	*tenuissima*	14 „

Average height of 1-year old trees.

Eucalyptus	*resinifera*	6 feet.
„	*tereticornis*	8 „
„	*pilularis*	12 „
„	*paniculata*	12 „

The growth of the last species on this list is a record one for an Iron-bark.

The wind at the higher elevations has had a marked effect on many of the trees, particularly *Eucalyptus globulus*, *E. robusta*, Ceara rubber, and one or two of the indigenous species tried. Here also a beetle (*Colasposoma* sp.) has worked havoc amongst the Eucalypts and Cypresses during the past two seasons, appearing in large numbers at the end of November, and disappearing again towards the close of February. These beetles feed on the bark, destroying young trees, and killing back larger trees for two or three feet.

At the lower elevation, 3,400 feet, White-ants have been bad, particularly to fruit trees and to *Eucalyptus robusta*. But at the lower elevation there are older trees, and this is the record of their height growth :—

	Average Height.	Age.
Acacia melanoxylon	24 feet.	4 years.
Cupressus goveniana ?	18 ,,	4
Eucalytus amygdalina	44	3½
siderophloia	21	3½
,, *robusta*	33 ,,	3½
Manihot glaziovii	19 ,,	3
Khaya senegalensis (African Mahogany)	18 ,,	4
Grevillea speciosa ?	9 ,,	3½
,, *robusta*	16 ,,	3½
Rauwolfia inebrians	17 ,,	3½
Pircunia dioica	17 ,,	4

PLANTATION IN SWAMP, AT ABOUT 3,300 FEET ELEVATION.

	Average Height.	Age
Eucalyptus robusta	33 feet.	3½ years.
,, *siderophloia*	21 ,,	3½ ,,
,, *amygdalina*	24 ,,	3½ ,,

,, *piperita ?* has done badly here, but *E rostrata* remarkably well."

At the mission station near Chirinda there are 12-year old trees of *Eucalyptus robusta, E. calophylla, E. amygdalina, E. viminalis, E. citriodora,* and other Eucalypts, all in a most flourishing condition. A well-grown Jarrah (*Eucalyptus marginata*) has been lately cut down because crowding other trees. It is remarkable that with so light a winter rainfall, and so heavy a summer rainfall, two winter-rainfall trees, viz., *E. calophylla* and *E. marginata,* have, thus far, succeeded so well. Mr. Swynnerton has found that planting in ground that had been ploughed or hoed gave much better results than planting in pits. Regarding the growth of his trees generally, he writes .—

"Of *Eucalyptus viminalis* I have only planted out one individual, having no special use for this species; it has grown with remarkable rapidity. *E. polyanthemos, E. gunnii* and *E. pellita* have also made a vigorous growth. Of the rest, *E. globulus, E. botryoides* and *E. saligna* have, wherever planted, made the most rapid growth; *E. saligna* has beaten *E. botryoides* on the richer ground. The slowest growers are *Eucalyptus crebra, E. marginata, E. salmonophloia* and *E. robusta*; the latter grows faster in the swamp. It is much damaged by our high winds. *E. rostrata* has done well throughout, but transplants badly; *E. piperita ?* makes an excessively slender though rapid growth, and is an especial favourite with the *Colasposoma. E. globulus* I am also discarding (except for wattle-work), as it makes a weak root-system in comparison with its rapid growth above ground and leans before the wind; on the neighbouring Mission farm, in an avenue exposed to the south-easterly gales, these have gradually weeded out all the Blue-gums, while affecting little or not at all the various other species planted with them. On Mr. Dierking's coffee plantation at Maruma, a few miles from here, the Blue-gums were attacked a year or so ago by borers, followed up by White-ants.

"*Eucalyptus citriodora* makes a beautifully straight and rapid growth in the district, even in the very teeth of the gales. We are at present continuing to plant, on a fair scale, only *E. botryoides*, *E. saligna*, *E. resinifera*, *E. siderophloia* and *E. citriodora*—the last three especially for timber, and the first two for shelter."

Pines.

Mr. Swynnerton has not been successful with pines, but as yet he has only tested one summer rainfall pine, viz., *Pinus longifolia*. He writes:—

"*Pinus insignis*, *P. pinaster*, *P. pinea*, *P. edulis*, *P. halepensis*, *P. taeda*, *P. canariensis*, *P. longifolia* and *P. douglassii* have been planted. *Pinus lambertiana*, *P. monticola* and *Picea engelmanni* have been sown, but failed to germinate. These Pines are by no means a success here. I have tried them both on the schist and on the sandier loam of the higher altitude, and, though one or two individuals of *P. pinaster* and *P. insignis* shot up and made a fair growth, the majority, even of these two species, remain stunted, and the only two species which have made a generally satisfactory start are *Pinus longifolia* and *P. canariensis*, now two years old, and even these stood still during the past summer, confining their growth mainly to the formation of numerous vigorous side-shoots. This may, I suppose, have been the result of the exceptional drought, and *P. canariensis* especially is now commencing to send forth strong leaders. Still, the average height is even now not more than 20 inches, with a maximum of 25 inches, while the only *P. pinaster* of that particular planting which has grown at all is just over three feet in height, but far less bulky than the *P. canariensis*.

Cedars.

"Of Cedars we have tried 17 species: *Cedrus libani* and *C. atlantica*, *Callitris whytei*, *Callitris columellaris* and *C. calcarata*, *Cupressus macrocarpa*, *C. goveniana*, *C. sempervirens* (both var. *pyramidalis*, and var. *horizontalis*), *C. elegans*, *C. lusitanica*, *C. torulosa*, *C. lawsoniana* (this still in seed-bed), *Cryptomeria japonica*, *Sequoia sempervirens*, *Thuya gigantea* and *Thuya orientalis*; also the three species from locally produced seed, which have so far remained unidentified, though it would appear extremely likely that two of them are simply *Cupressus goveniana* and *C. lusitanica* over again.

"Of the above, only the two Cedrus have failed, dragging on a miserable existence for several months at the height of two or three inches, and finally dying. The remainder are, without exception, flourishing, though, naturally, varying considerably in rapidity of growth. *Cupressus lusitanica*, both from imported and local seed, is distinctly ahead of all others in this respect, and is our choice for future planting. *Cupressus goveniana* and *C. macrocarpa* come next, but *Cupressus torulosa*, though healthy and vigorous, shews an uneven growth, a few individuals shooting up rapidly, while the majority have adopted a steadier pace. We have had considerable success in propagating *Cryptomeria japonica* by cuttings.

BEEFWOODS.

"*Casuarina leptoclada* and *C. tenuissima* planted at four feet each way, have done well and continue to make a vigorous growth, but we are not planting more owing to the necessity of protecting them against locusts.

Khaya Senegalensis (West African Mahogany), a native Tree of Wetter Rhodesia.— *Swynnerton.*

WATTLES.

"*Acacia dealbata* and *A. decurrens* are both making a healthy growth on the sandy soil, the only spot in which they have been permanently planted. An unidentified Acacia, the seeds of which were obtained from California, has made a handsome and vigorous growth, shewing now, at two years and six months from sowing, a maximum height of 19 feet 7 inches. However, one of the largest of these trees has just been destroyed by small borers (*Bostrychidæ*), and I fear that the remainder may suffer a like fate. Two other Acacias (*A. baileyana* and *A. longifolia*) are also making an excellent start. Only one specimen of the "Port Jackson" willow has been planted and is doing well.

"Blackwood (*Acacia melanoxylon*) has done well everywhere. It has been attacked to a slight extent by *Dorthesia*. .

OTHER TREES.

Trees that are Succeeding.

"Of the remaining trees planted by us, the following are in a thoroughly flourishing condition:—

Grevillea robusta (considerably damaged by locusts).
Albizzia moluccana, a native Albizzia (*fastigiata*) is a rapid grower and a desirable tree.
Aleurites tribola or Candleberry.
Ceratonia siliqua. Carob runs rather to branch, but is quite vigorous, and with a little pruning should rapidly make a tree.
Psidium. Six species or varieties.
Silver poplar.
Sapindus marginata.
Manihot glaziovii (Ceara rubber), flourishes exceedingly in fairly sheltered situations and friable soil.
Castilloa we are about to try.
Coffea arabica (Coffee) grows well and bears heavily—a good bean.
Schinus molle.
Ligustrum japonicum (Privet).
Camelia japonica.
Hakea sp. grows rapidly, but is destroyed by White Ants.

"Our best hedge plants are *Solanum aculeastrum* and *Carissa grandiflora*. We have also two small native *Carissas*, one of which makes quite a formidable hedge. Pomegranate also does well, but is not so effective as these others.

Trees that Promise Well.

"It is still somewhat early to pass an opinion on the prospects of the following species, most of which, however, are making a good start:—

Dalbergia sissoo.
Dracaena draco.
Liriodendron tulipifera.
Catalpa bignonoides.
,, *ovata*.
,, *hybrida*.

("We have been unable to obtain seed of *Catalpa speciosa.*")

Mango (seedlings from Beira).

Logan Berry.

Tea.

Paulownia imperialis.

Juglans nigra.

Hickory nut.

Pecan nut.

Cashew nut.

Castanea vesca (Spanish Chestnut.

Cinnamomum camphora.

Robinia pseudacacia.

Funtumia elastica promises well, having stood the past winter without flinching.

Sterculia platanifolia grew two feet only in two years, but is perfectly healthy in appearance.

Ailanthus glandulosa is to be rooted out, having taken to throwing up suckers.

"Tamarinds, *Magnolia grandiflora,* and *Elaeis guineensis,* have failed, but as we had only one or two trees of each species, this can hardly be taken as final.

"We have further planted experimentally, from time to time, a number of our more desirable native trees, and I feel satisfied as a result of the comparison which I have thus been enabled to draw, that many of these local trees, and more particularly those of Chirinda, are, for shade and ornament, more desirable than any of the imported trees which we have planted up to the present. Even Grevilleas, which have done well here and are distinctly ornamental, are not, in my opinion, to be compared with such trees as *Trichelia dregeana, Khaya senegalensis, Condalia usambarensis, Rauwolfia inebrians,* or our common Chirinda Gardenias: and we are now laying out a small arboretum to be devoted entirely to indigenous trees."

Mr. Swynnerton is a pioneer tree-planter in almost the most northern part of extra-tropical South Africa: and this account of his preliminary results will be read with interest throughout the sub-continent.

PENHALONGA MINE, UMTALI.

Here, under a heavy rainfall similar to that at Melsetter, and on rich soil, some remarkable tree growth has been recorded. I have been favoured with photos shewing a height-growth of 25 feet during the first eighteen months for Black Wattle (*Acacia decurrens*) and 35 feet during the first two years for Blue Gum (*Eucalyptus globulus*). I greatly regret that during my visit to Rhodesia time did not allow of my visiting either Umtali, Melsetter or the Inyanga plateau.

Mr. Philip Wrey of Bulawayo is the oldest and most enthusiastic forest tree-planter in Rhodesia. *Pinus pinaster* has been tried by Mr. P. Wrey, but succumbed during the dry spring of this year. *Pinus halepensis* succeeds. *Eucalyptus microcorys* also suffered this spring, while *E. siderophloia* and *E. crebra* have withstood the dry spring. Mr. Wrey has found Callitrises to do well; and he says that *Dalbergia sissu* looks well and does not mind the drought. He is writing to India for a large supply of Sissu seed. Besides private plantations, under his auspicès the Charterland Company have entered on a scheme under which they will plant 50,000 trees, selected from my No. 1 list, some of these trees being raised on the spot, and some sent up from the Government forest nurseries near Cape Town. It is worthy of note that in 1904, young trees in tins to the number of 15,300 were sent up from the Government nursery at Ceres Road, and cost with all the long railway carriage, by the time they were planted in Rhodesia, no more than 3¾d. per tree!

Around and near the burial place of Cecil Rhodes in the Matopos a national arboretum is being formed in obedience to the clause in his will which reads: "And, in particular, I direct my Trustees that a portion of my Sauerdale property, a part of my said landed property near Bulawayo, be planted with every possible tree, and be made and preserved and maintained as a Park for the people of Bulawayo."

In my report to the Rhodes' Trustees on the Matopo Park, 1903, is given a selection of four hundred trees odd, which are, more or less, suited to Southern Rhodesia. In that report Forestry and forest tree-planting in Rhodesia are discussed and it is unnecessary to do more than refer to it here. With our present knowledge of the tree-planting capabilities of Rhodesia, it may be considered as fairly complete. The list of trees for Rhodesia there given is divided into two nearly equal portions, the first part comprising those trees most suitable and most desirable to grow in Rhodesia; the second part comprising trees of less importance or of less climatic fitness, for trial after the first.

The following list, comprising 233 trees, is selected mainly from my Matopo Report No. 1 list, with some additions, chiefly Conifers, these being the class of trees that are most wanted in Rhodesia. The present list has had the benefit of Maiden's revision of the Callitrises (Forest flora of N. S. Wales) and of that fine work on the timbers of Queensland, recently issued by the Queensland Government: "The Merchantable Timbers of Queensland" by Philip MacMahon (1905).

I put forward this list tentatively. To quite fit Rhodesia climatically is not easy. The Queensland trees have too low, the Mexican, too elevated, and the Himalayan trees too wet habitats. The latter would be most at home on the Inyanga plateau. Only systematic trial over many years can shew what trees are really best suited to Rhodesia. No doubt most of the Queensland trees will succeed in the better watered parts of Rhodesia, altitude compensating latitude. The indigenous trees with the exception of *Callitris whytei* are unfortunately wanting in that first requisite of a country's timber supply—durable softwoods of the Teak and Cedar class.

SWINE FEVER, HOG CHOLERA, OR PIG TYPHOID.

By W. Robertson, M.R.C.V.S., Bacteriologist to the Department of Agriculture.

This is one of the most infectious and devastating of the epizootic diseases affecting swine. It is met with in most of the countries of the globe and known in Europe as swine fever, in America as hog cholera, and other parts of the English-speaking countries as pig typhoid.

Definition.

Simply, the disease may be defined as a contagious and infectious disease of swine, characterised by certain symptoms during life, and the presence on *post-mortem* of a number of ulcers and patches of ulcerations in the lining of the intestines, principally the large bowel, and other diagnostic lesions.

History.

In South Africa the disease appeared in June, 1904, in the Cape Town area and from that date it spread through the surrounding districts and completely cleared out all the pigs in the vicinity, whole villages being left without a single animal. Where the infection originated and through what port it entered the Colony we are unable to state, but by strict isolation, quarantine, prohibition of the removal of pigs from lately infected areas and other restrictions the disease has been restrained from extending up-country and is now almost non-existent in the Cape Peninsula. It has been known under various names on the continent of Europe for the past century, and it was in 1858 that cases of the disease were found in consignments of swine shipped to the Port of London. No doubt, many cases were landed before this date, but it was not until 1858 that a careful veterinary inspection was made of all over-sea arrivals entering England. In 1862 the disease was discovered amongst home-bred pigs by Prof. Simmonds who met with cases near Windsor and from the year 1865—when the infectious nature of swine fever was fully recognised—until 1878 it continued to spread in Great Britain and Ireland unchecked; and with the increasing facilities for movement by rail it is not surprising to find that by the latter year, it had been carried into nearly every county in England and into some of the counties of Scotland and Wales. Certain restrictions and preventive measures were put in force, areas were declared infected, farms quarantined, and markets closed, but it cannot be said that any results calculated to be of any permanent good were derived from the measures adopted, and it was not until November, 1893, that the Board of Agriculture, London, was called upon to adopt the stamping-out policy, and no duty so difficult, or troublesome, had ever been laid upon the English Veterinary Department since it was created in 1865 to deal with cattle plague. This is evidenced by the fact that swine fever has never been got rid of in the United Kingdom.

The following table will shew the loss which this disease causes to the British agriculturist:—

	Swine Fever.	
	Outbreaks.	Slaughtered.
Week ending June 30, 1903	57	353
Corresponding week in 1902	33	150
„ „ „ 1901	109	503
„ „ „ 1900 . .	76	677
Total 25 weeks ending June, 1903 ...	804	3,956
Corresponding period in 1902 .	836	3,904
„ „ „ 1901	2,011	9,723
„ „ „ 1900	1,105	11,812

And if these last figures are doubled we get the average yearly loss from swine fever alone. This is the out-of-pocket loss, nothing is calculated for loss of time, disinfecting, and perhaps loss of a special strain of breeding pigs.

In America the disease of hog cholera has threatened to completely destroy the hog raising industry in certain areas. It was evidently imported into that country from Europe, occurring in Ohio in 1833, South Carolina in 1837, and Alabama and Illinois in 1840.

In the States the yearly losses in proportion to the number of pigs bred are necessarily very great. In one year the State of Iowa alone lost pigs to the value of $3,000,000.

The presence of this disease in this Colony was not suspected until it was discovered in the month of June, 1904, amongst the pigs at the Government Wine Farm, Groot Constantia, and immediately afterwards in the French Hoek ward of the Paarl district.

A brief description of the disease appeared in the August number (1904) of the *Agricultural Journal*. This was written by the Chief Veterinary Surgeon, with the object of directing the attention of the farmers in the Western Province to the presence and prevalence of the disease, and detailing the commoner set of clinical symptoms and *post-mortem* lesions to be met with in cases of the disease, and to aid them in detecting the appearance of swine fever amongst their pigs. From information obtained subsequent to the discovery of the disease in the Constantia and French Hoek areas, it is very evident that swine fever had been prevalent amongst the pigs in the Stellenbosch district and on the Wynberg Flats for a considerable time before its true nature was recognised. Frequently reports were received from the police at Wynberg alluding to the mortality amongst the pigs on the Cape Flats, and on several occasions I went in search of these reported outbreaks, but was never able to secure any definite information or obtain a *post-mortem* on a recently dead animal. On several small farms the residents there announced that "many of their pigs had died, as they generally died at this season," and to minimise the impending loss they had slaughtered and sold to the butcher the remainder, and in every way possible the owners of pigs—even those who were the heaviest losers—seemed determined to withhold from us all information. In one herd of 800 pigs we found over 600 had succumbed, yet no information or news had ever leaked out.

Any one not conversant with the wild, isolated stretch of land known as the Cape Flats would naturally think that it would be impossible to conceal the existence of such a wide-spread outbreak of infectious disease, but such are the facts, and it was not until the pigs on the Government Farm, Groot Constantia, commenced to sicken and die that we discovered the presence in the Colony of swine fever. Previous to this we had been under the delusion that this disease was one of the few infectious stock maladies which had not obtained an entrance into the Colony. (Hutcheon.)

The Chief Veterinary Surgeon is of opinion that this disease has existed amongst the pigs of the farmers living on the Cape Flats for over two years. It is impossible now to obtain any definite information as to how or when the disease was first introduced into the Colony. It is even very doubtful if we are yet in possession of correct information as to the area over which the infection has spread. It was in May, 1900, that a Proclamation was first issued prohibiting the introduction of pigs into this Colony, except accompanied by a certificate that they were free from any appearance of disease before shipment, that they had been on the same premises for at least fourteen days before removal, and that they did not come from any place or area infected with swine fever, and that their movement is in conformity with the regulations enforced in the United Kingdom. In addition to this precaution, pigs in common with all other farm stock are examined at the ports before being allowed to land. There are no restrictions against the importation of pigs from any of the other South African Colonies. And, unless in the case of pigs which have been allowed to land for immediate slaughter, I am not aware of pigs being imported from any oversea country except England. The question arises, was swine fever introduced into this Colony prior to the Proclamation regulating their importation? I think the probabilities are that it was, and has been mistaken for a severe form of the contagious broncho-pneumonia, which is due to the invasion of the bronchial tubes of the lungs of pigs with those small lung worms, the *Strongylus paradoxus*. In expressing this opinion, I do not mean to infer that our regulations are sufficiently strict to prevent the possibility of any imported pigs introducing the infection of swine fever with them. All authorities are agreed that swine fever often assumes such a mild and chronic form, that the affected animals may not manifest any distinct signs of the disorder. They may feed fairly well, shew no rise of temperature, and give no visible indications for many weeks, and yet the organs of these apparently healthy pigs may be found, on *post-mortem* examination, to be clearly, and in an advanced stage, affected with the distinctive lesions of swine fever. It is very evident, therefore, that pigs which are affected with swine fever in this occult form may be bought and sold over and over again, and moved about freely without exciting the least suspicion that they are affected with a highly infectious disease. It is very evident, also, that the infection of swine fever may be introduced into a new country without being detected, unless an extended quarantine is enforced. And it is equally manifest that many outbreaks of the disease may occur in which it would be difficult to trace the source from which the infection came.

SYMPTOMS OF THE DISEASE.

The symptoms of swine fever are not very distinct, either at the commencement of the attack, or even during the course of the disease, and the similarity of the symptoms with those of other swine diseases renders it necessary that *post-mortem* must be made before a reliable diagnosis can be arrived at. Increased temperature up to 103-4°, increased susceptibility to cold, causing the animals to bury themselves in the litter, from which it is difficult to rouse them, with staggering gait and weakness in the hind-quarters. As the disease advances the hind-quarters may become semi-paralysed. The skin is very sensitive, and red blotches appear on neck, back of ears, belly and thighs; in acute cases these patches of discolouration extend and coalesce and assume a darker hue.

In one case there were a number of circular circumscribed ulcers on the skin of the belly and flank varying in colour from crimson to dark purple and black (See fig. F.)

There is sometimes a cough, aggravated when the animal is moved, short breathing, costiveness, followed by diarrhœa in the later stages, increased debility and death.

The progress of the disease is very variable, in some acute cases it runs its course in two or three days, terminating fatally, while in others it may last longer.

POST MORTEM APPEARANCES.

Swine fever like typhoid fever in man is essentially a disease of the digestive organs, its chief characteristics being certain morbid

DESCRIPTION OF COLOURED PLATE.

FIG. F.—Skin of abdomen of Pig E shewing the peculiar lesion sometimes met with.

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changes of a well marked nature which are found upon the surface of the mucous membrane in some part of the alimentary canal.

The changes referred to consist of what have been commonly described as the formation of a series of ulcers, single or confluent, distributed upon some part of the intestinal tract, varying in shape and size, from a yellowish grey to black colour and assuming, as a rule, a circular form. In some instances the lesions consist of diphtheritic exudations with necrosis of the lining membrane of the bowel.

These ulcers or patches are most commonly met with in the large intestine, and frequently at the junction of the large and small intestine (ileo cæcal valve) and in the cæcum or blind gut (See figs. D. and E.)

These ulcers rarely penetrate the gut and have a strong tendency to heal, if the animal lives long enough. Next to these intestinal lesions the mediastinal lymphatic glands shew changes, being enlarged, congested, hæmorrhagic and in many cases black on section.

In the late outbreak at the Constantia Farm a considerable number of cases shewed the lungs affected, the general condition being that of bronchitis accompanied by pneumonia and followed by collapse of the lung lobule, this consolidated part became œdematous and on section presented a smooth semi-solid leaden coloured surface.

In the earlier stages the lung feels when the hand is drawn over it like a mass of frog spawn or as Prof. Hamilton says in his description of commencing catarrhal pneumonia "there are seen irregularly shaped pneumonic patches, corresponding in size to that of a lobule of the lung, which have a greenish colour and from which when squeezed a yellow catarrhal fluid can be pressed out. These areas are soft somewhat raised and vascular." The more dependent parts of the lungs (especially the anterior lobes) which have passed through the œdematous stage have now become solid, hard and glassy looking. (Hutcheon.)

On making a section through some of the lobules situated immediately above these solid portions which are packed with catarrhal products, numerous small caseous abscesses, about the size of a large pin's head will be observed to be forming. Many pathologists consider the lung lesions found in cases of swine fever to be of secondary importance, and in the Report of the Department for Agriculture in London, 1898, the Chief Veterinary Adviser to the Privy Council says :—"The observations made by the Veterinary Officers of the Board when examining the viscera forwarded to the Laboratory for examination caused them to doubt whether there was any disease of the lungs of pigs which in the absence of lesions in the intestinal tract could be accepted as evidence of swine fever.

"The only lesions which can be characterised as absolutely typical of swine fever are those present in the bowels, the absence of which will justify any observer in declining to accept the case as one of swine fever without further evidence or enquiry It must, however, be distinctly understood that in the case of very young pigs which have died shortly after infection there is often an entire absence of the lesions described, the only changes present being inflammation of the stomach or some part of the intestines."

Briefly, therefore, the most typical and only characteristic lesions, according to English veterinary surgeons, seen in *post mortem* in cases of swine fever is the lesion in the form of ulceration of the lining of the digestive tract principally that of the large intestine, and frequently pneumonia.

I subjoin a few of the details of the *post mortems* made upon pigs which succumbed to swine fever during the late outbreak of that disease in the Cape Colony.

Pig A shewed slight discolouration of skin under belly and at base of ears on p.m.; the voice was hoarse and the animal coughed at intervals; there was a large quantity of fluid in the abdominal cavity, and the lungs were almost solid, and exuded clear straw-coloured fluid on section.

Submaxillary Lymphatic Glands.—Glands at base of lung and in inguinal region swollen, and in case of latter group hæmorrhagic.

Mesenteric blood vessels congested, and lymphatic glands enlarged. Congestion and thickening of the mucous membrane of the large intestines and three typical swine fever ulcers in the region of the ileo cæcal valve.

Pig B., Killed.—Lungs much affected, quite solid in places, lymphatic glands in submaxillary, inguinal and mesenteric regions enlarged, spleen spotted with ecchymoses. Liver healthy. Intestines congested in places, and a large ulcer at region of the ileo cæcal valve.

Pig C., Killed.—Lymphatic glands in inguinal region and mesenteries enlarged. Spleen enlarged. Intestine slightly congested around ileo cæcal valve. Several ulcers (5 or 6). Lining membrane of stomach, covered by necrotic scabs the size of a split pea.

Pig D.—Lungs badly affected (a few *S. paradoxus* in terminal bronchi). Kidneys, a pale buff colour. Cæcum mucous membrane, a pale pink colour, thickened and congested, necrotic patches scattered over surface varying in size from a millet seed to a mealie. A few necrotic patches in cæcum. Stomach normal. Submaxillary and mesenteric glands enlarged.

Pig E., Killed.—A small pig in very poor condition, with husky voice and staggering gait, had been showing signs of sickness for three weeks. Belly and sides showed patches of a dark purple colour, sharply circumscribed, and varying in size from a pea to a sixpence. The colour was dark reddish purple, the lesion extended through the skin to the subcutaneous layers as a dark patch. *Lungs*

DESCRIPTION OF COLOURED PLATE.

FIG E—Gut shewing typical Swine Fever ulcers (junction of Ileum and Cæcum).

FIG. D—Enlarged ulcer, showing necrotic area surrounded by a zone of inflammation

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badly affected, quite solid with a yellow exudate when cut, pleurisy in a mild degree, no parasites. Lymphatic glands enlarged. Eleven ounces of fluid in peritoneum, visceral and parietal serous membranes, covered by a sticky fibrinous fluid, the fluid in the peritoneum was mixed with flakes of fibrin. Necrotic patches in cæcum and throughout large intestine, but in a state of resolution. Stomach normal. Spleen slightly enlarged.

Pig F.—Animal was in good condition, and had been sick nearly a month. *Lungs much affected*, gangrenous pneumonia present, a putrid odour on opening chest, bronchial, mediastinal, and submaxillary lymphatic glands enlarged, hæmorrhagic and friable. Stomach showed remains of old ulcers in and around cardiac area, and one healing ulcer on fundus. Mesenteric lymphatic glands enlarged, reddened and friable on section. Large intestine, particularly terminal end of cæcum, shewed numerous necrotic ulcers, covered with a hard, dark greenish crust, and surrounded by an inflammatory zone. These ulcers, in certain parts, viz., the region of the ileo cæcal valve, tend to coalesce, and large distinct necrotic patches were seen through the length of the colon and upper half of rectum.

Pig F.—This animal died during the night. Entire lungs involved, and the lymphatic glands under jaw at base of lungs and in mesenteries affected. Skin reddish in patches on flank, abdomen, and behind ears. No intestinal lesions. Spleen normal.

Pig G., Killed.—This animal had a slight cough, some froth running from the nose, and loss of power in hind legs. *Lungs affected*, left almost solid, submaxillary and deep inguinal glands enlarged, friable and juicy, spleen enlarged, darker in colour and softer in consistency than normal. Intestines normal.

Pig H., Killed.—Lungs much affected, no fluid in peritoneum, kidneys paler than normal, congestion of large intestine and an ulcer at junction of ileum and caecum. Lymphatic glands enlarged.

It will be seen from the few examples of the ordinary lesions met with in swine fever *post-mortems* in the Cape area that the lung lesions are fairly constant and that they can occur independently of the bowel ulcers, so in this respect, we would, in this country, seem to be at variance with the majority of the Home authorities who do not regard the lung lesion as characteristic of swine fever. Professor McFadyean (*Vet. Journal*, Aug. 8th, 1896) states "Lungs and Pleura.—The only lesions that are frequently encountered in the lungs of pigs that have died or have been killed while suffering from swine fever are small hæmorrhages and collapse. This collapse appears to be due simply to the feebleness of the respiratory movements and cannot be regarded as in any way an essential lesion of swine fever." This opinion is also shared by the experts of the Board of Agriculture. Perhaps some diseases, change their characters in some slight degree in a tropical or sub-tropical country, at any rate at least eighty per cent of the cases of swine fever seen by me and on which I made *post-mortems* shewed lung lesions, so I would warn any pig breeder in this country to regard with extreme suspicion a large mortality amongst his pigs where the clinical symptoms and *post-mortem* lesions pointed to pneumonia and on *post-mortem* to make long and repeated searches for the typical intestinal ulcer.

In several cases I found rather a common lung parasite of pigs in the Western Province viz the *Strongylus paradoxus,* but the pneumonia I alluded to was quite different from any irritation set up by such parasites. These *Strongyles* are to be found in the end bronchi of the lungs, are of a reddish-brown colour and about the thickness of a horse hair. In searching for them, take the lung of a pig recently dead (as the worms rapidly disintegrate with the onset of putrefaction), and follow a bronchus to the end of the lung and the parasites will be found in the terminal channel, but the pneumonia set up by such is quite different from the lesions met with in the affected lungs in swine fever.

In the *post-mortem* on pig *E* I noticed the curious skin lesions, *i.e.* the purple concentric circumscribed patches (well seen in the sketch, Fig. 1) penetrating to the subcutaneous tissues. This lesion would appear to be a rare one in swine fever, no veterinary surgeon who has seen them can recall similar specimens. Prof. McFadyean (*Vet. Record,* August 1, 1896) alludes to the skin lesion as a rash, "in rare instances the skin shews discolourations and mottling with livid dark spots" and in a foot-note : "I remember seeing in the possession of the late Prof. Walley some pieces of skin with circular greyish patches of necrosis which he regarded as examples of cutaneous swine fever lesions and which certainly had a remarkable resemblance to the ulcers in the large intestine."

The points which are of most importance to diagnosis when sickness appears amongst pigs are :—

(1) A record of exposure to infection or of contact with pigs whose history is not known, *i.e.* purchase in market or auction.

(2) Evidence that the illness is contagious, when a number sicken and die after one another.

(3) The appearance of some of the symptoms, already mentioned under that heading.

(4) The appearance at the *post-mortem* of one or more of the typical lesions of the disease, that is, ulcers in intestine, enlarged mesenteric glands, and pneumonia alone or in company with the preceding lesions.

CAUSE OF SWINE FEVER.

The cause of this disease is a microbe—a bacillus—the true discoverer being uncertain. Klein and McFadyean in England, Salmon in America, and Selander, Danz, and others have all given the disease much attention.

McFadyean says: "The organism of swine fever is a bacillus whose length varies from $\frac{1}{25,000}$ of an inch to $\frac{2}{25,000}$ of an inch in length, they have rouded ends and do not produce spores, are motile and stain by the ordinary aniline dyes."

This bacillus can be obtained from the diseased animal, cultivated in artificial media outside the animal body, and produces the disease when the culture is inoculated into a clean pig from whom the same bacillus can again be recovered, thus proving it to be the cause of swine fever.

PREVENTION OF THE DISEASE.

Curative remedies may be dismissed very shortly, as none are said to be of any avail. In many parts of the States (where the corn or mealies are eaten by the pigs and thus marketed *i.e.*, the corn is sent to market on the hoof and naturally the disease causes heavy and serious losses) large sums of money have been made by unscrupulous quacks selling nostrums, and much loss and disappointment have been the result of their use..

Recovery can hardly ever be said to occur. Even in very mild cases on *post-mortem* examination it is invariably found that ulceration of the intestinal coats has occurred, and although healing has taken place, the causal bacilli of the disease can be found in the lesions in the intestines. *Hence so-called recovered pigs are always dangerous.*

In the Report of the Departmental Committee of the Board of Agriculture, Great Britain, appointed to enquire into the cause, nature and *post-mortem* appearances of swine fever, 1895, the Committee draws attention to this chronic infective form as of frequent occurrence.

"There are also, and always have been, many cases of the obscure chronic form of the disease in which the morbid changes go on slowly for weeks and months, and finally attain an excessive state of development without being attended by any of the symptoms which are usually accepted as diagnostic of swine fever.

"Some very important information as to the obscure forms of swine fever was obtained by the committee by the examination of swine which had been isolated for a period of two months on infected premises; at the end of the time they had been certified to by a veterinary surgeon as free from swine fever and would in the ordinary cause have been released. In several of these instances, instead of being released, the swine were, at the request of the committee, slaughtered and the organs sent for examination. In each set of specimens, characteristic lesions of swine fever were detected."

From this we see the importance of *killing off all the herd of pigs when the disease appears* and cleaning out the place thoroughly and starting afresh.

SWINE FEVER IS COMMUNICATED FROM ONE HERD TO ANOTHER

(*a*) *By direct communication, i.e.*, by introducing infective pigs into herds, by sending sows for service from one farm to another and from the infective dung of so-called recovered pigs.

(*b*) *By indirect communication, i.e.*, by people conveying the infection of the disease in their clothing, boots, utensils, implements, fodder and waggons, and by dogs, fowls, rats and frequently, in pig breeding areas in Europe, by infected railway trucks. McEachran has noted the spread of the disease by water streams.

PREVENTIVE MEASURES.

Every breeder, or feeder, of good pigs ought to arrange his premises so that he can divide them into perfectly isolated piggeries, so that if, by some misfortune, disease is introduced into one lot, the others may be preserved through isolation.

Breeders and owners would serve their own interests by providing a separate pen as a quarantine pen for the detention of all new purchases, in which they may be kept for a few weeks, to make sure that they are free from disease.

When the disease (or a disease suspected to be swine fever) is introduced into a herd, immediate notice should be given to the nearest Resident Magistrate, Government Veterinary Surgeon, or the Department of Agriculture direct, who will investigate or cause an investigation to be made, and if the disease turns out to swine fever, will quarantine the place, cause the slaughter and destruction of all diseased animals, and have all in-contacts, in a fit condition, killed, and, if meat is in good condition, allow same to be sold to the butcher.

Every pig on the farm should be killed and the premises thoroughly disinfected in accordance with the wishes of the District Veterinary Surgeon.

DIRECTIONS FOR DISINFECTION.

The flooring, divisions and base boards of the pen should be removed, and any loose boards with which the pigs have come in contact burnt. If the shelter is, as it often happens to be, just a scrub and bush house, better burn the lot. The surface earth or gravel of the pens and yards should be removed to a depth of six inches, freely covered with newly-slacked lime and re-covered with fresh earth or gravel.

The manure is a fruitful source of re-infection. The bacillus of swine fever can live in water for four months, and in soil three months, and in manure it lives an indefinite time.

Litter from affected pigs should be burnt or mixed with quick lime and ploughed in on land not likely to be grazed on by pigs or animals which can come in contact with pigs. (This manure question is a very important point, and one worthy of most careful consideration by any pig owner who has had the misfortune to lose a number of animals from swine fever and desires to clean his place with the intention of re-starting pig-keeping.) The bacilli of the disease adhere to the hair of the legs of horses and cattle, and can be conveyed by them to streams of water, and render the water infective for pigs miles distant.

Sick pigs if allowed to roam around the cattle kraals, under buildings and into stacks of bush and bedding render complete disinfection impossible.

Orchards or small fields over which pigs have had the run should be ploughed after being freely covered with lime.

Lanes and fences should be cleaned in the same manner as the yard, the ground rails and the fences should be burned.

The clothing of all persons who have been attending to, or engaged in killing and burning the pigs should be boiled and their boots thoroughly scraped, cleaned and soaked in a solution of carbolic acid 1 to 80 of water.

The pens, building, fences and other permanent structures with which diseased pigs have come in contact should, when possible, be thoroughly douched with boiling water, scrubbed with a rough brush and then given a coating of lime wash to every five gallons of which a pound of crude commercial carbolic acid has been added. By aid of a spraying pump cracks and corners may be searched better than by the brush.

To be effective, this disinfection must be thorough.

After cleansing and disinfection expose the premises to sunlight and air freely for about three months before placing pigs in there again.

Visiting during an epidemic of swine fever, or before proper disinfection, should be curtailed as much as possible, and as disease can be carried away on the boots, horses or dogs from neighbouring farms may also carry infection to neighbouring farms and should therefore be prohibited from entering the premises.

There is no other contagious disease of domestic animals that requires for its eradication so much persistent co-operation between the owners and the Government Veterinary Surgeons and such strict attention in disinfection to what many people are prone to regard as mere trifles (*Bulletin* No. 2, Ottawa). Prof. McEachran in his bulletin on the disease "Swine Fever" finishes his monograph with a few words of excellent advice.

How Pigs May be Kept Healthy.

There are no farm animals that can be made to yield so large a profit as well-managed pigs—none that will so readily respond to efforts at improvement, in breeding and feeding—on the other hand none degenerate so rapidly under a system of neglect and mismanagement. They require warm dry sleeping places, damp cold insanitary pens are ruinous to the health of pigs.

Their food should be sound, sweet, and given at regular intervals, the troughs should be kept clean and the pens regularly cleaned out. If pig-feeders would but consider that the stomach and intestines of the pig closely resemble their own, perhaps more care and discrimination as regards the feeding of these animals might result.

I would strongly urge that the boiler be brought more into use by the pig raiser and breeder. Boiling food would at least insure freedom from disease germs and worms.

Certain foods favour the attacks of disease. Hotel swill, although not necessarily producing disease, may contain pork in one form or another. Ham, sausage, etc., etc., act as a vehicle for the conveyance of the disease.

This kind of swill also frequently contains soap, polishing paste, brine, etc. (I would here like to direct the pig keeper's attention to the effects of this last substance on pigs. I have seen a lot of pigs staggering about with patches of discolouration on the skin simulating the cutaneous lesions of swine fever, simply as the result of drinking in their swill a quantity of brine from pickled beef).

VERMINOUS BRONCHITIS.

Verminous pneumonia produced by the *Strongylus paradoxus* is fairly common amongst pigs in the Western Province and might be mistaken for swine fever.

The ova of the worms are taken into the stomach and find their way into the bronchi where they set up irritation, produce obstinate coughing and a form of lung consolidation and pneumonia. These worms are coughed up and find their way to the stomach whence their ova are expelled in the fæces to infect other pigs.

In regard to the treatment—Turpentine, in doses from 15 drops in little pigs to a dessertspoonful in large ones, given in milk well shaken up twice daily will be beneficial in the case of intestinal worms; powdered resin may be mixed with the food, or powdered areca nut, four grains to every pound of animal's body weight, may be given.

CO OPERATION IN AGRICULTURE.

The following have been issued as leaflets by the Department of Agriculture :—

CO-OPERATIVE CREDIT SOCIETIES.

(AGRICULTURAL BANKS).

At recent meetings and conferences of farmers throughout Cape Colony the advisability of bringing into play similar institutions to popular Agricultural Banks or Credit Societies in Europe has been frequently discussed. How far the organisation of agricultural credit on the co-operative plan may be introduced in South Africa must needs receive thoughtful consideration. In the present state of the Law in Cape Colony, Co-operative Credit Societies on the Raffeisen plan are impossible, as no act of the Legislature similar to the Friendly Societies Acts in Great Britain, or the acts in favour of popular credit institutions in other European countries, has yet been introduced.

It is clear, however, that farmers cannot carry on their business without capital. If this capital be not present in the shape of ready money it must be secured in the form of credit. Ready money is not always available to farmers in any part of the world, but the honest and solvent man is always in the possession of credit. The needs of his business often compel him to change his credit capital into ready money; and the farmer should see that this change is affected with the least possible expense, and in the manner most convenient to himself. It is one of his greatest needs that there should be a method by which he can obtain ready money cheaply on the security of his acknowledged credit. He generally obtains his profit from the results of his labours once or twice in the year; and unless he has money already in his possession he must, for a considerable time, buy on credit or borrow to meet his various needs.

It may happen that from want of ready money he must sometimes part with the produce of his land at a time when prices are low, and when, consequently, he would suffer serious loss; whilst if he could obtain money to hold over such produce for a short time he could, generally speaking, effect a better sale.

There are some improvements certain to repay their cost which would be made on the farmer's holding, such as draining, erection of sheds or shelters, fencing of portions of his land, facilitating irrigation within the confines of his farm, and so forth, or he may have opportunities for the cheap purchase of cattle, sheep, pigs, or other animals which would be lost if ready cash were not available. It is clear to every farmer that the advantages of being able to obtain ready money easily, and at a low rate of interest, are very great.

In the present condition of South African affairs a farmer must borrow from the joint-stock banks of the Colony, but as borrowing individually is attended with a great deal of inconvenience and frequently some risk to the bank, THE RATE OF INTEREST IS VERY OFTEN HIGHER THAN THE FARMER SHOULD, LEGITIMATELY, BE CALLED UPON TO PAY. Very often the banks cannot consider the circumstances of the farmer in making advances, and the period of time for which the loan is made must suit their convenience for repayment, and renewals may be expensive and irritating. On the other hand, farmers may borrow from money-lenders or may receive advances on their crops or on something which they have to sell. These kinds of transactions are, in most instances, attended by a serious loss to the producer. In making advances in this way, especially in the case of the poorer farmers, a high rate of interest is frequently charged, and the advance being made on the security of produce to be sold, the farmer is more or less helpless when he comes to transfer the produce of his farm to his creditor. He cannot be said to be a free agent in the sale of his goods, and the business intelligence available for farmers in the remote districts is hardly such as would ensure the bargain being a perfectly fair one. Apart from this, the system of barter in which farmers' agricultural commodities are exchanged for others through the medium of a middleman, whose interests it is to make as much profit as possible, cannot help having a demoralising effect upon the whole community. This becomes much more intensified if the exchanges TAKE PLACE AT THE INSTANCE OF SPECULATORS, whose business it is to make a living by trading upon the helplessness and want of knowledge on the part of the farmer. The beginning of all co-operative undertakings in continental Europe has been the establishment in the first place of a sound system of credit. In Germany co-operative credit has come to be regarded as the saviour of the agricultural interests of that large empire. In France it has come into the service of the people everywhere. In Italy it has rescued a miserable community of small land-holders from the grasp of the usurer. In Ireland, Belgium, Holland and Denmark it has been called into service. The system has been in operation for over six years, and IT IS A GREAT TRIBUTE TO THIS LONG CAREER OF ACTIVITY THAT NOT A SINGLE PERSON, EITHER MEMBER OR CREDITOR, HAS LOST BY THESE CREDIT INSTITUTIONS ONE SINGLE PENNY.

An eminent authority writing on the influence which these societies have exercised on the industries of the countries in which they have been worked, says:—"Homes have been made habitable and comfortable, cultivation has improved, machinery has been purchased and the best feeding stuffs; the smallest farmer can now buy his manures and implements of the best quality at the cheapest wholesale prices, and the usurer has been driven out of the field."

In Holland this co-operative movement has made the most marked progress among the Dutch people, and at the close of 1904 there were no fewer than 700 societies throughout the various provinces of that kingdom, making hundreds of thousands of loans annually to the farmers.

THE LEADERS OF SOCIAL AND ECONOMIC MOVEMENTS IN HOLLAND HAVE BORNE THE MOST STRIKING TESTIMONY TO THE NATIONAL VALUE OF THE EXTENSION OF FARMERS' CREDIT SOCIETIES.

In any locality in Cape Colony where money is scarce and where it could be usefully applied, and where the conditions of borrowing are against the welfare of the farmer, an agricultural bank should certainly be started. The formation of a credit society will generally be on the same lines as that of a co-operative winery or a co-operative dairy. The farmers who propose to establish such society must begin by taking shares in a company with limited liability, creating as large an amount of share capital as possible as security against such advances as they may find it necessary to negotiate. A united body of farmers may in this way borrow large sums of money for the benefit of its members on terms which would be impossible to them individually. For example, if security in the shape of share capital upon which a small first call had been paid up be established, it would be a case in which a joint stock bank or the Government would consider whether advances would be made to a local committee to assist their members with loans for productive purposes in connection with the working of their farms. Thus, in the case of application being made to a joint-stock bank a sum of a thousand pounds might be advanced at, say, 5 per cent., where members, individually, would be unable to secure it under 7 or 8 per cent. and, in such cases as might be approved of by Government, it would be quite legitimate to make advances to co-operative societies out of money provided by Parliament at say 4 per cent. Money acquired in this way would be lodged to the account of the co-operative credit society in the nearest joint-stock bank and, with the approval of the committee, loans could be made to members who thus obtain, for such periods as they might require it capital which would undoubtedly largely influence the extent and value of their production.

There will very likely be difficulties in borrowing in the earlier stages of the life of one of those little credit societies; but as the bank gets better known, facilities for raising capital will become easier and its work will be here, as elsewhere, gradually more and more appreciated.

If a credit society could obtain money say at 4 or 5 per cent., it would lend to its members at 6 per cent., and the interest charged would only be payable at the same time as the loan. Moreover, such amounts would be advanced by a committee of local men who knew the exact conditions of the borrower and who would interest themselves in seeing that it was properly applied. Wherever such societies have been in existence, usury and trafficking in the produce of the people has gradually disappeared, and a spirit of independence and hope has come over the farmers. The constitution of a credit society is thoroughly democratic, each member having an equal voice in the election of the committee to manage the society and having the right to be satisfied from time to time on every detail of its financial standing and the methods of its management. The society is under the control of a small committee of the most intelligent and active farmers in each district, and this body, with the assistance of a secretary can carry on the work of borrowing and lending at the least possible expense. The duties of the committee are to admit members, grant loans, and fix rates of interest for borrowers.

The greatest security, apart from its share capital, which such a society can offer to the outsider is the good character of its members and, therefore, no one can be admitted whose honesty, thrift, and general standing are not well known. No improvident person ought to be admitted. To enable the committee to judge upon these exactly, the area of a bank's operations should be confined to a district where the general character of a possible applicant may be known to all. In addition to taking shares, a small entrance fee of a shilling would be charged to persons about to become members. The shares would be of the nominal value of £1, and these should be taken in such number by each member having regard to his social standing or the size of his farm.

Applicants for loans must state the purpose for which the loan is required, and the length of time for which the loan will be made will be determined by the nature of such purpose. Money will never be lent unless for a profitable or productive purpose or to effect some economy. The borrower must enter into a bond to apply the loan to the purpose for which it is granted and also to make repayment at the end of the period for which, in the opinion of the committee, the loan should be made. He must convince the committee, that he will be able to repay after making a profit on the proposed transaction. If a borrower desires to repay by instalments, interest will only be charged on the amount in the borrower's possession at any time. Interest will not be deducted beforehand, but will be repayable with the loan or the instalments. The rate should not exceed, according to the conditions upon which the capital might be borrowed, a higher figure than 6 per cent. Banks having been started in this way may allow their members, if they think it desirable, to pay up their shares in full; and on such shares interest may be paid at the rate fixed by the committee, this is generally between 3 and 4 per cent. Profits made by the bank will at the end of each year, be added to the reserve fund, in order to increase its security. The possible profit which may arise is the difference between the interest at which the credit society may borrow and at which it lends to its members, after paying its working expenses. These working expenses are usually very little, the secretarial duties being, as a rule, performed by some public spirited man having an interest in the people of the district. Books and stationery are very simple and cost very little.

The Department of Agriculture will include the supervision of credit societies in its scheme of agricultural inspection, and from time to time make minute examination of each society's affairs and report fully to its committee. Such inspection will of course, be carried out with the sanction of the local committees themselves, except in those cases in which loans have been made by the Government where the Treasury must be satisfied, from time to time, that the money is being properly dealt with.

Fuller information and draft rules may be had on application to the Agricultural Department, Cape Town.

CO-OPERATIVE DAIRYING.

Co-operation in agricultural production has been, perhaps, more successful in connection with dairying than with any other branch of farming. In nearly every country in Europe, and in most British Colonies, there are numbers of Creameries and Cheese Factories; in Holland over 700; in Ireland nearly 600; in New Zealand over 200; in Australia over 400; and there are also several thousands in the United States of America.

The object of inviting farmers to combine for the purpose of erecting creameries is, in the first instance, to raise the standard of quality of the butter produced, in giving it uniformity in every respect, colour, flavour, texture, saltness, &c. A uniform article being thus raised to the highest standard possible by the application of scientific methods, the Co-operative Society is enabled to come into direct business communication with the best markets, and obtain the best price. As an instance of the success of Co-operative Dairying it may be mentioned that New Zealand and Australian butter is at the present time being manufactured in enormous quantities under the control of the farmers in these Colonies, sent down to the ports where the Societies by their federation have established cold storage depots, and then forwarded to English markets in steamers fitted with refrigerating chambers. So successfully has this been done that during the season 1904-5 butter from New Zealand and Australia was able to compete with that from Denmark and Ireland.

During the past few years the import of dairy produce into Cape Colony has been very great. The actual returns for last year alone shew the value as exceeding half a million sterling. Is it possible by organisation among farmers throughout this Colony to produce sufficient butter of high quality to successfully compete with the foreign article? This certainly seems not to be impossible, and several Districts are carefully considering the proposal to establish Co-operative Creameries.

Co-operative Creameries are of two kinds, namely, those which receive whole milk from farmers, as is generally the case throughout Europe, and those which receive cream only, as is the custom in

America. Having regard to the size of farms in this country, the American system will, in all probability, be found most convenient, and it is hoped that the following simple explanation of the manner in which it is carried on will be found useful to farmers.

A convenient centre having been decided upon, the farmers within a radius of, say, from 12 to 20 miles, would forward their cream, daily if possible, but with careful attention to certain details in the keeping of cream, alternative daily deliveries may answer the purpose quite as well. In the delivery of cream, farmers living on the same road will find it convenient to take their neighbours' supplies in turn; thus if there are five farmers living in a particular direction from the Creamery one takes the whole of the amount of the five farms one week, the second another week and so on. This will be found to save a considerable amount in time and labour. It is understood, of course, that cans for the delivery of cream in this way are locked, each lock having two keys bearing corresponding numbers. One key is kept by the farmer and the other at the Creamery. This effectively prevents tampering with the cream during its journey to the Creamery. The cream, having being received by the Manager, is carefully weighed and samples taken. The weight of cream is inserted in the pass-book of the farmer from whom it comes, and to whom the book is returned after each delivery. The testing of the cream is carried out on what is known as the "composite system," that is to say, the samples taken each day are kept in bottles for a week and an average of the mixture is drawn. The percentage of butter-fat in this is obtained through the medium of the "Gerber" tester.

At the end of each month the total amount of butter fat supplied from each farm is carefully calculated, and the rate per lb. having been fixed on the basis of the price obtained for the butter, the farmer receives a cheque for the actual value of the cream supplied.

The first point to be considered in the establishment of a Creamery is the number of milch cows available within a given radius. This should not be less than 350, whilst if there were 500 it would be so much the better, as, of course, the greater the number, the more economically could the working be carried on.

A reliable supply of good water is absolutely essential; and before a site is acquired, the probability of obtaining this must be carefully looked into. The site should, in every case, be selected as convenient to a railway station as possible, or at a point where a number of roads converge, in order to minimise the cost of cartage from the farms.

The capital for the establishment of a Creamery must be raised, in the first place by the shares subscribed by the farmers themselves. The number of shares in any District should not be less than 1,000 before application is made for the registration of a Company. A district in which there are 500 milch cows and where the farmers have, as a beginning, applied for 1,000 shares, need have no hesitatios in proceeding to business at once. The liability of shareholders in limited; no man being liable for a greater sum than the nominal value of the shares for which he applies. Shares will not be called up in cash except in so far as the first call is concerned. This might be 5s., or even 2s. 6d., per share, at the option of those interested. If everything goes on satisfactorily it will be necessary to make no further demands in cash upon the members. The uncalled portion of the shares will remain as partial security to the creditors of the Company for any sums which it may be necessary to borrow. The Creamery Society becomes a legal corporate body by being registered under the Companies' Act No. 25 of 1892, and draft articles of association and specimen rules may be obtained on application to the Department of Agriculture, Cape Town.

The management of the Society will be in the hands of a small board of five, or seven, of the most intelligent and capable men in the District. They will be elected by the members at a general meeting; their manager and the assistants will be duly qualified persons who will give security for the faithful discharge of their duties, and the books and accounts of the Society must be at all times open to the inspection of the Directors. The latter must satisfy themselves, at least once a month, as to the position of affairs.

A sufficient number of cows being available, and a sufficient earnest being shewn in the shape of shares applied for, the Society will be in a position to approach the Government in order to negotiate a loan, on the security of its property, to assist in the erection and equipment of the Creamery.

The cost of a Creamery in this Colony depends, of course, largely upon local conditions. If a site can be secured easily, and if the expenditure in finding water be moderate, the site, well, and building should not exceed £1,000. The cost of machinery, including boiler and engine, refrigerating machine, cream vats and tanks, churn, butter-worker, and other necessaries will range from £1,200 to £1,500. A sum of from £300 to £500 as working capital to enable the Society to successfully surmount the initial difficulties of its business must, however, be counted upon. Thus the total cost in favourable circumstances will run from £3,000 to £3,500.

Where railway facilities are available, cream may be taken considerable distances by train, but every precaution must be adopted in placing cream-floats in the cans, and having them carefully covered with canvas or linen cloths.

In creamery Districts, farmers must, of course, provide themselves with hand separators; and leaflets with instructions both with reference to the use of these machines and to the proper handling of cream will be issued by the Committees in each case.

The advantages of a Co-operative Creamery may be summarised as follows:—

(1). A high class butter of uniform quality will be produced, and through the agency of central depots, which it is hoped the Co-operative Creamery Societies will establish, or through the medium of the best provision houses in the Colony, this article will fetch a high price.

(2). With the production of a high class butter in sufficient quantities, the import of the foreign article will immediately decrease, as the consumers will not purchase butter, in many instances probably containing boric acid compounds, while they can get the pure wholesome produce direct from their Colonial dairies.

(3). A new and remunerative branch of farming will be at once opened up, which, when it comes to be understood, will be found to add little to the farmer's expenditure, while adding considerably to his revenue.

(4). The breeding of a better class of milch cow will be encouraged and the creameries may be made the means of introducing high class stud animals.

(5). The feeding of milch cows with crops grown upon the farm will come to be understood, and instead of corn, oat-hay and other farm produce being sold off, very often at exceeding poor prices, they may be converted into butter and milk.

(6). With a large quantity of separated milk available on the farm, pig-raising, on more profitable and scientific lines than is at present common, will be brought about and thus material will be provided for Colonial Bacon Factories.

(7). The Creamery will be the centre for the dissemination of agricultural intelligence, and will provide lectures from time to time, and introduce various experiments and demonstrations which will improve the pratical education of the farmer.

(8). As soon as a number of Creameries come into existence they may form a federation of their own, which has been the case in all other countries; this will be of great national importance in improving the cattle and dairying industry of the country.

(9). The making of cheese and the sale of cream and pasteurised milk will, of course, in suitable localities be added to the ordinary business of making butter.

The Department of Agriculture will be prepared to assist Co-operative Creameries in any or all of the following ways:—

(*a*) The preparation of articles of association, rules, and the provision of plans and specifications and buildings.

(*b*) The examination of machinery specifications for equipment and contracts.

(*c*) Such expert advice as may be desirable from time to time in carrying on the work of the concern.

(*d*) Periodical inspection of accounts and preparation of reports for the information of Committees on the efficiency of their management.

(*e*) Arranging, as far as possible, to suggest with the progress of Co-operative Dairying, the names of skilled persons for the position of Manager.

The farmers of this Colony are earnestly invited to carefully study the text of the preceding statements, and in consultation with one another in their respective Districts, make up their minds whether they are prepared to support this industry. Every Co-operative Creamery erected will be a tribute to the intelligence and business capacity of its promoters, will assist in the development of local industry, and tend to make our Colony self-supporting.

Copies of this leaflet can be procured upon application to the office of the Secretary for Agriculture.

LUNG-SICKNESS OF CATTLE; CONTAGIOUS PLEURO-PNEUMONIA, OR PLEURO-PNEUMONIA-BOVUM-CONTAGIOSA.

By D. Hutcheon, M.R.C.V.S., Acting Director of Agriculture.

This disease was introduced into Cape Colony in 1854, by some Friesland bulls which were imported from Holland and landed at Mossel Bay. Since that date it has spread all over South Africa, and has been the cause of serious losses to the cattle farmers of South Africa anually.

Etiology.—This is a specific infective fever, due to the entrance into the lungs of a minute micro-organism. It affects bovine animals only, and is characterised by an exudation of an albuminous limpid serum into the lymphatics and meshes of the interlobular tissue and air cells of the lungs.

Messrs. Nocard and Roux, after much labour and difficulty, discovered the micro-organism of pleuro-pneumonia and also succeeded in cultivating it, first by enclosing the serum containing it along with a bouillon in collodion capsules, which were then inserted into the peritoneal cavity of a cow or rabbit. Subsequently they succeeded in cultivating it in test tubes in an artificial medium composed of peptone, to which a small proportion of the serum of the blood of a cow or rabbit is added, and with these cultivations they inoculated five Breton cows, and succeeded in causing the development of an absolutely characteristic pleuro-pneumonia swelling, which conferred an immunity from further infection on these animals, thus confirming the fact that they were dealing with the causal agent of pleuro-pneumonia. Since then a large number of animals have been inoculated with this cultivated lymph, and the results are stated not to differ appreciably from those obtained with the natural lymph. Messrs. Nocard and Roux describe the organism as a microbe of extreme tenuity which appears like small refractile moving particles, too minute for their exact form to be discerned with the highest power of the miscroscope after colouring.

The Period of Incubation.—That is, the period which intervenes between the first contact of healthy susceptible cattle with those affected with pleuro-pneumonia and the date on which the first symptoms of the disease appear in the former. This period is generally stated to be from three to six weeks, with a maximum interval of about four months and a minimum of ten days. But the disease may continue to spread in a herd for from six to twelve months, although all animals are exposed to infection from the beginning. In our experiments the sick and healthy animals were not merely kept in close contact during the night in a moderately small kraal, but also had their muzzles brought into immediate contact, so that the healthy animals were compelled to breathe the breath of the affected animals for a short time daily, this being continued until the first animals shewed symptoms of being affected. The following were the results obtained; two animals shewed a rise of temperature and visible symptoms of the disease on the 42nd day after contact, one on the 51st, one on the 52nd, and two on the 59th, one remaining unaffected.

Three of these animals died, one was killed to obtain lymph, and two recovered. No medicine was administered.

The Course of the Disease.—One of the above animals died on the 17th day after becoming visibly affected, the second on the 31st and the third on the 33rd. The fourth was killed on the 6th day after the visible symptoms appeared, and both lungs were found affected, the right more than the left, each having a distinct centre of infection. Recovery commenced in the one case on the tenth day, and in the other on the 28th. Some authorities state that the temperature begins to rise for a week or more before the visible symptoms appear, but in these cases the thermometer did not give any indication of fever until one or two days before the animal could be observed to be amiss, although the temperatures were taken once daily, in the morning, from the date of contact. These morning temperatures of the affected animals ranged from 102° to 104°, rarely the latter. The evening and midday temperatures, when taken, were one to two degrees higher, depending on the temperature of the atmosphere. The pulse is of no value in the diagnosis of pleuro-pneumonia, or of any other disease for that matter, in the case of semi-wild cattle, which are always excited when caught for examination.

If we compare the long and indefinite interval which usually elapses between the date of exposure of healthy cattle to infection, and the first indications of the presence of pleuro-pneumonia in the exposed animals, with the comparatively uniform short period of incubation which follows when the disease is communicated by artificial inoculation, we are justified in assuming that some preparatory change in the epithelium of the smaller bronchi and air vesicles of the lungs is necessary to enable the micro-organisms of pleuro-pneumonia to enter the interlobular tissue of the lungs, and that it is the length of this preparatory period which mainly accounts for the difference in the period of incubation.

This view is further supported by the fact that the visible symptoms of the disease follow close upon the first rise of temperature, and that when once the disease starts in the lung its progress is usually very rapid. This rapid extension of the specific exudation frequently follows inoculation, even when performed in the tail, for if once the swelling begins to spread at the seat of inoculation, it extends up the tail with alarming rapidity.

Symptoms.—The general symptoms are:—the animal looks dull, and the hair is erect—"staring coat"—there is at first partial and later complete loss of appetite, and rumination ceases. In cows the secretion of milk is much diminished and very soon stops.

There is an occasional dry husky cough, which can be excited, and greatly increased, by driving the animal hurriedly for a short distance. This is an excellent aid in the diagnosis of the disease in loose semi-wild cattle.

The cough gradually increases both in frequency and intensity, and becomes more and more painful and distressing. The breathing also becomes quickened as the disease advances in the lungs; the animal stands with its head depressed, and its muzzle extended; its forelegs are kept wide apart, and the elbows turned out; the nostrils are dilated, and there is a distinct upper and outward movement of their edges with a corresponding heaving of the flanks, and a peculiar and characteristic grunt accompanies each expiration. When the patient lies down it rests on its sternum, to avoid compression of the chest.

The bowels are generally constipated during the early stages of the disease, but diarrhœa frequently occurs at a later stage. Tympanitis is apt to occur if the patient is allowed free access to water. In cases in which the front lobes of the lung or lungs become consolidated, and press against the thoracic portion of the trachea, I have seen the animals standing with their heads elevated and their muzzles protruding in a straight line from the neck, a quantity of frothy saliva surrounding their lips, their mouths open, their nostrils dilated, and the poor animals literally gasping for breath, moving about the picture of agonized distress.

Auscultation.—On applying the ear to the sides of the chest, an absence of the respiratory murmur will be detected over particular parts of the lung or lungs, and bronchial respiration will be heard in its place, along with sounds of friction and wheezing. Over the healthy lung the vesicular respirations are much increased.

Percussion.—On tapping the sides of the chest with the knuckles, the animal evinces great pain, and instead of the resonant sound of health, the chest gives out a dull dead sound, corresponding to the extent of the consolidation in the lungs. If one lung only is involved, that side of the chest will be observed to bulge out more prominently than the other. The patient becomes greatly emaciated, dropsical swellings appear on the lower parts of the body, such as under the throat, in the dewlap and the lower parts of the chest and abdomen. The action of the heart becomes weak and palpitating, and the animal finally dies of suffocation.

But a correct diagnosis of single isolated cases of contagious bovine pleuro-pneumonia, cannot be made with certainty, without a post-mortem examination, unless the disease has already appeared in the herd, or in the immediate neighbourhood, or several cases have appeared simultaneously to justify the opinion of its presence, as the acute symptoms of the advanced stages of non-infectious inflammation of the lungs, and of traumatic pneumonia—due to a foreign body having penetrated into the pleural cavity or lung tissue—simulate very closely those of contagious pleuro-pneumonia. Even advanced tuberculosis of the lungs may be mistaken for pleuro-pneumonia.

Post-Mortem Appearances.—On opening the chest we generally find on the affected side a quantity of a yellowish turbid fluid, with a large amount of fibrinous coagula floating in it, and adhering to the membranes. The fluid when exposed to the atmosphere soon coagulates into a jelly-like mass. The pleura is thickened, and its surface is covered with a layer of lymph, giving it a rough appearance, and where the parietal and visceral pleura are not kept apart by the fluid exudation they become united by the layers of fibrinous lymph, which in old cases becomes replaced by fibrous tissue, causing firm adhesions of the lung to the wall of the chest. As a rule one lung only is affected, but portions of both may be involved. The affected lung is larger, and greatly increased in weight, and the diseased portions stand out prominently above the adjoining healthy lung tissue. On making a section through the consolidated portion, the cut surface presents a marbled appearance. The marbling is due to the altered and enlarged condition of the interlobular septa, or membranous tissue which separates and surrounds the lobules. "These septa are composed of a meshwork of delicate connective tissue filaments, saturated with a straw-coloured liquid. This liquid, or lymph of inoculators, is contained in the greatly distended lymphatic spaces and vessels of the septa, and also in the lymphatics surrounding the blood-vessels. When this lymph escapes from the lymphatics, it usually soon forms a soft coagulum. At the margin of the consolidated area the thickening of the interlobular tissue shades off gradually, but is usually traceable into the non-hepatised lung tissue. The lymph is not present in the liquid form in all the thickened septa, in some it is in the form of coagulated fibrin, while in older affected portions it may be still firmer, having a fibrinous appearance. The section of the consolidated lung appears as small islands surrounded by the pale septa; the shades of colour vary from buff or yellow, light red or salmon coloured, deeper red or flesh coloured, and deep dark red like extravasated blood. An essential feature in the marbling of contagious pleuro-pneumonia is the variety of colour presented by the ground work or pulmonary parenchyma. We know of no other disease in which this form of marbling is produced. The density of the parenchyma or lobular tissue, like that of the interlobular septa, is variable, and there is generally a gradual transition from the hepatised to the normal lung at the border of the solidified portion."

"The outer air cells of the lobular tissue become filled with lymph, and the central cells become compressed by the pressure of the same lymph. In the dark coloured areas the air cells, as well as the septa, are crammed with blood, and in old cases the walls of the air vesicles are thickened by the formation of connective tissue. The fibrinous exudate in the air cells may be of recent formation, or it may already have undergone hyaline or fatty degeneration. A most notable feature of the lesion in the lobules is that it is not at any time associated with marked distension of the pulmonary capillaries, such as is constant in the early stage of other forms of pneumonia" (Prof. McFadyean). As a general rule sporadic pleuro-pneumonia appears suddenly and runs its course rapidly. Contagious pleuro-pneumonia, on the other hand, develops more slowly and runs its course less rapidly. The principal post-mortem distinction between them is:—In sporadic pleuro-pneumonia the consolidation in the lung appears to be nearly all of one age, whereas in contagious pleuro-pneumonia there is not alone a greater increase in the breadth of the interlobular tissue, but the consolidation of the lung tissue appears to be of various ages and consequently presents different shades of colour and general appearance.

The Starting Point, and Sequence of the Lesions in the Lung Substance.—This is a point on which there is considerable difference of opinion amongst microscopists. Dr. Yeo is of opinion that the disease commences in the smaller bronchi by irritation of the mucous membrane by the specific micro-organisms. This leads to chronic ulcerative bronchitis; occlusion of the affected air tubes; lobular pneumonia; a thickening and infiltration of the walls of the air tubes with the products of chronic inflammation, &c. Dr. Woodhead* has arrived at somewhat different conclusions from Dr. Yeo. He says: "It appears probable that in the case of pleuro-pneumonia the organism is taken into the lungs by inhalation (as a matter of fact all cows cannot be made to take the disease experimentally), and it is quite possible that some antecedent bronchitic change is necessary. From analogy it may be argued that this material passes into the air vesicles, and sets up only slight catarrhal change, if any change at all. From the vesicles (and in some cases say also from the minute bronchi) the organism finds its way into the lymph spaces in the wall of these vesicles, and there commences to multiply. From either of these positions the virus may be followed by its effects.

As will be observed from my remarks in explaining the effects of *drenching,* I am led to agree with the view expressed by Dr. Woodhead, and also with the additional remark made on the same subject by McFadyean. He says wherever the initial lesion is "There is clear evidence, in nearly every case of the disease, that the affection spreads by way of the lymphatic vessels and spaces of the interlobular connective tissue (including the peri-bronchial and peri-vascular lymphatics), and that the implication of the bronchial and alveolar epithelium is purely a secondary process. In all cases the primary and essential change is a distension of the lymphatic vessels and spaces of the part with fibrinous lymph that is comparatively poor in cellular elements. Indeed, in a great measure, the lesions when fully established appear more of a lymphatic engorgement than an inflammation, but doubtless this

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engorgement is associated with a true inflammatory process at some points of the lymphatic system of the parts."

METHOD OF SELECTING THE VIRUS.

An animal suffering from the disease in its earlier stages should be selected by preference. It should be killed and properly bled. The carcase is then laid on its back, and the skin removed from both sides of the chest. The breast-bone and costal cartilages are then removed. This will expose the lungs, and shew in which side of the chest the pleural fluid is contained, if there is any present. This fluid may be either scooped out with a small jug, or a tube may be inserted between the ribs, as near to the spine as possible, and the fluid drawn off into a flat basin.

If this fluid is bright, clear and thoroughly aseptic, it may be used for inoculating with, but if it is muddy, septic or blood stained, it should not be used for inoculation. It is necessary then to obtain the virus from the lungs. Remove the whole of the diseased lung carefully from the chest, place it on a clean table or sheet of corrugated iron, in a cool place. Let it lie for half an hour or more until the blood has had time to coagulate; then disinfect the surface of the lung, and with a sharp pointed knife carefully make an incision along the white bands of interlobular tissue, converting them into a sort of open drains; the serous fluid or lymph, will then gravitate into these channels, and enable you to scoop it out with a narrow teaspoon or eggspoon; or it may be drawn up with a syringe.

Another method is to carefully separate the pleural covering from the diseased portion of lung from which you are to extract the virus, in such a way as to form a pocket at the lower border of the lung; then open the lymph bands as above directed, and allow the virus to drain into this pocket, from which it can easily be lifted out with a spoon, and transferred to a wide mouthed bottle or jar. Still another method recommended is :—"To dig one or several funnel shaped holes in the diseased tissue, into which the liquid will percolate, and thence be scooped out." (Theiler).

In the more recently affected portion of the lung, the spaces between the interlobular lymph bands present a pinkish yellow colour, and its cells are filled with a clear serous fluid. It is from this recently affected portion that the best virus is obtained, and should always be selected. The virus usually coagulates, immediately after it is withdrawn from the lung, it should, therefore, be strained through two or three folds of clean muslin, or other porous cloth, and placed in sterilised bottles, and kept in a cool place. Unless the virus is to be used at once, one fluid drachm of pure glycerine should be added to every ounce of virus, or one part of glycerine to eight parts of virus, and shaken together. But although the virus can be preserved for a considerable time in this manner, it is advisable to use it within fourteen days; it cannot be depended upon if kept much beyond that period, unless it can be kept in an ice-chest, when retains its virulence much longer.

All instruments and utensils used in collecting and preparing the virus should be sterilised.

THE CULTIVATION OF PLEURO-PNEUMONIA LYMPH IN YOUNG CALVES.

Pasteur's assistants—Dr. Germont and M. Loir—carried out a series of carefully conducted experiments for the Queensland Government in 1888-89, with the object of discovering an improved method of inoculation against the contagious pleuro-pneumonia of cattle; and amongst many interesting facts which they elucidated, they proved "that the virus taken from the lung of an animal suffering from pleuro-pneumonia and inoculated behind the shoulder of a calf from five to six months old produces a large œdema, and that the liquid or lymph taken from this œdema has always proved virulent, and that it maintains its virulence after three successive transmissions through calves, but in order to preserve this virulence it is necessary from time to time to rejuvenate the virus by a return to a case of spontaneous pleuro-pneumonia."

The calves destined to furnish the virus should be inoculated in the neck or behind the shoulder, the latter by preference, by the hypodermic injection of about 15 drops of virus obtained from the lung or pleura of an affected animal.

After from five to ten days, or sometimes a little later, a slight swelling is observed, which increases during the following days, both in thickness and in width. This swelling is painful when pressed, and as it expands, the temperature of the animal becomes progressively higher, varying from 105° to 107° Fah.

At the end of one or two weeks the swelling ends by covering the whole of the abdomen; extending sometimes from the groin to the neck. Generally, however, it remains limited to the side of the body on which the inoculation was performed; occasionally the exudation spreads into the thoracic cavity.

The animals do not always succumb to the consequences of inoculation, the chances of survival are all the greater the older the animals.

The death of the calves may be awaited, or they may be slaughtered in the full evolution of the disease, when the œdema is sufficiently large for practical purposes. Before opening the tumour to collect the virus, it is necessary first to break down, with a few smart strokes with a hammer or wooden mallet, the meshes of the connective tissue in which the lymph is imprisoned; this facilitates the collection of the virus, and has moreover the advantage of mixing the lymph with the solid particles which appear to contain the active portions of the virus.

To collect the virus the body is placed on the healthy side, and an incision is made along the whole extent of the tumour, and the skin is raised in such a manner as to form a pocket, in which the liquid will collect and from which it can easily be extracted. The meshes of the connective tissue may be further lacerated with the knife, if necessary, to free the virus. When the lymph is being collected in this way it is a transparent limpid fluid, but after a short time the fibrine coagulates and forms a clot; it is necessary to inoculate some of this solid matter.

All the operations must be carried out with the utmost cleanliness and antiseptic precautions, the hands and instruments must be disinfected, and the vessels for receiving the virus properly sterilized. When the virus is to be kept, an antiseptic, such as glycerine, 1 to 8 of virus, and a half per cent. of carbolic acid, is added to preserve it.

Artificial Culture of Pleuro Pneumonia Virus.

The artificial culture of Pleuro-pneumonia virus is made in a medium called "Bouillon Martin," to which about 5 per cent. of normal serum of an ox is added. The culture is easily obtainable by filtering the "virus" taken from the chest of a lungsick animal together with the broth—"Bouillon Martin"—in the proportion of about one to two per cent.

The broth when kept in the incubator becomes after two or three days, slightly opalescent, which indicates that the microbes are growing. Such a culture when injected into a susceptible animal, behaves exactly as does the liquid taken direct from the sick animal.

It has the advantage that it can be continuously transplanted into new media for many generations.

These retain their virulency; it is in fact pure virus. (Dr. Theiler).

Methods of Inoculation.

The farmers practise several methods. A common practice is to make an incision under the skin of the tail, and insert a piece of wool which has been soaked in the virus and maintaining it in position by a string or strip of calico. If the wool were previously cleaned in boiling water and dried in the sun, there would be no objection to this method. But as generally used, the wool is liable to contain septic organisms.

A very objectionable method of inoculation is sometimes practised by the farmers; it consists in making an opening in the skin of the tail, or cutting a piece of the skin out, and fastening a piece of the diseased lung onto the wound. Septic infection of the wound, resulting in a large mortality, is almost certain to follow this method of inoculating.

The usual method of inoculation practised is the insertion of a seton soaked with virus under the skin of the tail near its point. The instruments required are an inoculating needle, a pair of good sized sharp scissors—a good sheep-shears acts well—and some woollen thread, such as Berlin Wool or Scotch fingering.

The woollen thread should be cut into 4-inch lengths, and placed in open-mouthed bottles, which for convenience should hold from four to six ounces of virus. Several hundred threads can be soaked with the virus in each of these bottles, and they are easily extracted with a forceps as required.

THE INOCULATING NEEDLE.

The inoculating needle is about four inches long with an eyelet near the point, its base being inserted into a convenient handle. These needles can be obtained from Messrs. Mayer & Meltzer, Surgical Instrument Makers, Cape Town.

In securing cattle for inoculation, trained transport oxen may be caught and fastened by the horns to one or two wagons placed lengthwise in front of each other, the oxen being packed together as close as possible. Cows and other tame cattle can be caught by a riem, after which a man at each horn can hold the head, while another fastens a rope or riem round the hind legs to hold them firm. This protects the operator, while it prevents the animal from jumping about. Semi-wild animals must be cast, or passed into a crush.

In thus preparing the way for the operator, great care should be exercised not to harass, beat or bruise the animals in any way, and on no account should any animal be caught by the tail when being thrown. Any such injury is liable to induce swelling at the part injured when the virus is circulating in the blood.

Having secured the animal, the operator proceeds to clip off the hair from the brush for about two inches upwards from the point of the tail on the upper side. The part should then be cleaned and disinfected with a brush and suitable fluid. To facilitate matters this should be done by the assistant. The operator then holds the tail firmly by the brush with his left hand, while with the right he carefully passes the needle up under the skin in a straight line for an inch and a half, passing the point of the needle out by gentle pressure on the handle, after which he moves the needle so as to enlarge the channel. One saturated thread is then put through the eye of the needle and drawn till both ends are even. The operator now retracts the needle, drawing the thread into the channel after it, meanwhile gently compressing the lower orifice with the thumb of his left hand to retain the virus. When the point of the needle is clear, the thread is clipped off close to the needle, thus leaving the main portion in the channel. In this manner, with plenty of assistance, one inoculator can inoculate from three to four hundred in a day.

During recent years, more particularly in the Australian Colonies, the needle and thread have been largely replaced by the hypodermic syringe for inoculating cattle as a preventive of the contagious lungsickness. The method adopted is similar to that now so largely practised in inoculating cattle against Quarter Evil. The hair is clipped from the upper surface of the tail for about six inches extending from the tip. The part is then cleaned and disinfected with a five per cent. solution of carbolic acid or Jeyes' Fluid applied with a brush. Then insert the hypodermic needle under the skin, and carefully pass it down between the skin and subcutaneous tissues for about one and a half inches, move the needle from side to side so as to enlarge the channel at the lower end, then withdraw it a little, attach the syringe to the needle, and inject the virus —about 5 or 6 drops—then withdraw the needle and syringe together; at the same time, with the thumb of the left hand, close the puncture in the skin, and gently rub the part containing the virus so as to spread it out in the cellular tissue. In Australia they have hypodermic syringes which regulate the dose from a well which is attached, and the operator simply injects the dose under the skin without any preparation of the part.

A very strong syringe and needle are required, as the skin near the point of the tail in full-grown cattle is firmly attached to the subcutaneous tissue. This method of inoculation has the great advantage that there is no open wound by which septic or other germs can enter.

A pock is expected by many, but this is not usual, nor is it necessary. Theiler says that it should reach at least the size of a hen's egg. It is usually severe, and not without danger if it does. Such a swelling, if left alone, has a great tendency to extend up the lymphatics of the tail to its base, often involving the tissues of the hind quarters and the organs of the pelvic cavity. When the exudation extends up the tail, one of the first indications is swelling of the lymphatic glands or "kernels" on each side of the root of the tail. Many farmers cut these glands out—I have frequently done it myself—and when the operation is performed before the exudation has extended to the surrounding tissue, it is a very effective means of preventing the further extension of the swelling. "But the swelling of the glands is secondary to tho irritation, swelling and death of the tissues at the point of the tail. Hence, by amputating the tail upwards from the tip until healthy tissue is reached, there is no necessity for touching the glands until they show indications of containing pus, when they should be freely opened meantime they should be dressed with the following mixture:—

Linseed oil	...	...	...	1½ pints
Turpentine	...	...	...	4 ounces
Carbolic acid	. .	...	...	2 ounees

to be applied daily over the whole of the inflamed and swollen surface. In addition to this external dressing, one tablespoonful of sulphur should be administered to each affected animal daily. In the course of a week the swelling will gradually subside" (Soga). It is therefore important to observe that as soon as a swelling appears at the seat of inoculation, and from the swelling there exudes a yellowish serous fluid similar to the virus introduced, do not hesitate, but amputate above the swelling at once, and see that the tail bleeds freely. The bleeding may be stopped by a ligature, but it is more satisfactory to use a hot iron—a docking iron is best—and sear the wound. This prevents septic poisoning, and secondary swellings which are apt to follow, more especially when there are a number of swollen tails in a herd. To prevent this, it is also advisable to remove every animal with a badly swollen tail from the herd.

"Does Inoculation introduce Lung-Sickness into a Herd of Healthy Cattle?"—The large majority of experienced Colonial farmers are fully convinced that the disease does occasionally appear in a clean herd of cattle after inoculation, when there is no other source of infection known.

Admitting that such infection does occur; the question arises:—How is the disease introduced? Do inoculated cattle communicate the disease to healthy susceptible cattle with which they come into immediate contact? The opinions of Colonial farmers are somewhat divided on this point, but the general opinion of European experts, arrived at by close observation and experience is, that healthy cattle inoculated in the tail, in the usual manner, do not communicate the infection to healthy susceptible cattle with which they mix, and the somewhat extensive experience of our own Veterinary Staff supports this view.

THE AFTER TREATMENT OF INOCULATED CATTLE.

Close attention should be given to inoculated cattle from the fifth day onwards. After this the cattle should be regularly kraaled, and particular attention should be given to the animals when they rise in the morning to see if they manifest any stiffness or inability to lift their tails. Any such symptom should lead to the animal being caught and its tail examined at once.

By the tenth day the inoculation should have *taken* in a considerable portion of the cattle. This *taking* is manifested by a slight swelling at the seat of inoculation, with a beady exudation from the surface of the skin.

Is it possible, then, to communicate lung-sickness to healthy cattle direct by inoculation at the tail? The large majority of European experts express a confident opinion that you cannot, and when the disease does appear in an apparently clean herd, after inoculation, they assert that the infected animals must have contracted the infection previous to their inoculation, or before the inoculation has had sufficient time to confer immunity on them. Of course it is impossible to prove the contrary, more especially as inoculation against lung-sickness is usually resorted to only when the disease has already appeared in the herd itself, or amongst some herds in the near neighbourhood.

But from the numerous instances in which I have observed the disease to follow inoculation, when no other reasonable explanation could be offered except that of direct communication by the inoculation (*vide* my Annual Report for 1887 and *Agricultural Journal* vol. v., p. 231), I am thoroughly convinced that inoculation is capable of communicating lung-sickness direct to a healthy susceptible animal. I am quite ready to admit that such cases are comparatively rare; but that they do occur, and are the means of introducing the disease into a previously healthy herd, I entertain no doubt whatever, and it does not appear so improbable that such cases should arise under special circumstances.

It is a well-established fact that if an ox, which has been inoculated or drenched as a preventive of lung-sickness, is operated on for any other cause, or receives any external injury, during the time that the specific virus is circulating in the blood, specific local swellings are liable to occur at the seat of injury, and often assume serious proportions, proving fatal in many cases. May not the same local manifestation of the disease occur in the lungs, through the accidental rupture of a small blood vessel, or local injury to the lung-tissue, thus permitting the organisms of the disease to escape into the interlobular tissue?

I observe that MM. Nocard, Roux and Dugardin-Beaumetz (*vide Veterinarian* Jan. 1900) state "that they failed to produce the lesions of pleuro-pneumonia in the lungs, whether the virulent lymph has been injected into the trachea, sprayed or blown into the trachea, after drying and pulverizing, or even injected directly into the lung parenchyma, or given by the digestive tract, etc.," but Professor Nocard adds: "I do not dare, however, to conclude from this isolated experiment that intra-pulmonary injection will always be without risk." I should think not, and judging by our experience I am surprised it is not always followed by serious results.

SUCCESSFUL INOCULATION.

It is necessary to bear in mind that inoculation does not render any animal immune, unless it has taken properly. This has been abundantly demonstrated on numerous occasions. But a very interesting case occurred during one of the experiments conducted by Veterinary Surgeon Soga in 1892. Mr. Soga was one of the most skilful and successful of inoculators; in the experiment referred to, one young ox did not react to the first inoculation although all the others operated on took well. After an interval of three weeks, this ox was re-inoculated, more carefully if possible than on the first occasion. Still the inoculation did not take, and it was concluded that this ox possessed an immunity to the disease, either natural or acquired by previous treatment. In order to test this, he was placed amongst some cattle affected with the disease, and in due course he became affected and manifested all the typical symptoms of the disease, and died.

This proves, not only that no animal can be rendered immune by inoculation unless the operation has taken properly, but it also shews that, even when the operation has been performed with the utmost care, by a skilful operator, and with well selected virus, it cannot be claimed that the inoculation will be successful in each animal operated on in a herd of cattle, even when such animals are susceptibile.

There is another point of equal importance to remember, and that is, that an inoculated animal, even when the operation is successful, is not rendered resistant to infection until after the inoculation has taken effect, which at the earliest is about the eighth day and very often as late as the twenty first. This shews that all the cattle in an inoculated herd are liable to become affected with lung-sickness for at least eight days after inoculation, if exposed to infection, and many of the successfully inoculated ones for a much longer period, while those in which the inoculation has completely failed to react, have no immunity conferred on them whatever—hence they are liable to contract the disease at any time, if exposed to infection. This shews the necessity for carefully removing every affected animal from the herd, in order to remove all sources of infection.

It is also necessary to mark all the cattle in the herd in which the inoculated has failed to take properly. These should be re-inoculated at the end of a month. Unless these precautions are taken, the disease may linger amongst the susceptible cattle in the herd for an indefinite time.

DRENCHING.

With respect to drenching—that is, the administration by the mouth of a certain quantity of the fluid found in the thorax—as a preventive of lung-sickness, the experiments conducted by the Veterinary staff, in addition to the previous practical experience of hundreds of colonists, have clearly shewn that drenching is an effective preventive against an attack of the contagious lung-sickness of cattle, when properly carried out. It is also comparatively free from danger, if proper precautions are taken, and due care exercised in administering the fluid. The following are the points which should be carefully attended to:—

(*a*) The fluid found in the chest of an affected beast should *alone* be used for drenching, and it should be used pure after being strained,—no water should be added to it, but the mouth of the beast may with advantage be washed out with clean water after the dose has been administered. This is merely to clean the mouth, and prevent local inoculation, should there be any abrasion of the lining of the mouth. Some place a tablespoonful of common salt in the beast's mouth, immediately after administering the dose of *lung-water*, to clean the mouth, and it is an excellent plan. I have used it largely myself.

Experiment has proved that large doses of the *lung-water* may be administered with safety, but I would recommend for full grown beasts about ten fluid ounces, or a large breakfastcupful. Less for younger animals in proportion to age.

(*b*) The practice of taking the diseased lung, mashing it up and then mixing it with a quantity of water, and using this mixture as a drench is not to be commended, because, as a rule, an affected beast, the *lung-water* of which is to be used for drenching, is invariably allowed to live until nearly the climax of the disease, in order to get as much fluid out of the chest for drenching purposes as, possible. That being so, the affected lungs are full, not of specific lymph, but of other degenerated diseased products, and consequently the mixture made with these products and water exercises very little specific effect on the system, and cannot therefore be depended upon to act as a preventive against an attack of lung-sickness—but it is very liable to produce blood poisoning.

(*c*) In administering the fluid, every care must be exercised to prevent any injury being inflicted on the mouth either by the finger nails or the bottle used for giving the drench. The least abrasion of the mucous membrane lining the mouth, or covering the tongue, is liable to lead to local inoculation, which generally terminates fatally. For the same reason, cattle which feed on rough and thorny veld, or have access to prickly pear, should not be drenched, as they are liable to have slight sores in the mouth, which are liable to lead to local inoculation. Even in the ordinary Karoo veld, it is always advisable to collect the cattle, and keep them from grazing for about twenty-four hours before drenching them, so that any slight abrasions may have time to heal before the cattle are drenched. Cattle which graze on grass or bush veld are, as a rule, pretty free from such abrasions of the mouth. Operations such as castration, earmarking, and the like should not be performed on young cattle that have just been drenched, as specific swellings are liable to appear at the seat of operation, and even at the seat of an injury of any kind.

With respect to the manner in which drenching with the fluid found in the pleural cavity gives an immunity to the animals, it is a very well-attested fact, that the characteristic exudation found in the lungs of the affected animals can be produced by inoculation into any part of the body—externally or internally—wherever the specific virus enters the connective tissue. For example, if a beast is inoculated subcutaneously about the chest or dew-lap, after the usual interval, the characteristic exudation will rapidly form in the connective tissue of the part, and extend along the lymphatics until in some instances, I have seen it enter through the anterior opening of the thorax, and involve a considerable portion of the lungs before the animal succumbed.

In like manner, when the animal is inoculated in the tail, and the swelling and exudation extend up the lymphatics, and enter the pelvic and abdominal cavities, the whole of the organs and tissues situated in these cavities are frequently found adherent and saturated with the characteristic exudation of pleuro-pneumonia.

Likewise, when an animal is drenched with the "lung-water," as it is called, and there happens to be any abrasion of the mucous membrane of the mouth or throat, etc., local inoculation is certain to take place, and the animal invariably dies from the effects of the extensive local exudation which follows.

Further, I have seen the characteristic exudation occur in the abdominal organs after the animal has been drenched, the whole of the abdominal organs being glued together by an exudation exactly similar to that seen in the lungs of an affected animal; while the abdominal cavity was filled with fluid indistinguishable from that found in the thoracic cavity in an ordinary case of the disease. In such cases the inoculation of the abdominal organs must have taken place through some abrasion of a certain portion of the mucous membrane of the bowels. But so long as the epithelial covering of the mucous membrane lining the digestive track remains whole and sound, no local inoculation can take place, and large quantities of the lung fluid may be administered to an animal with perfect safety. But although a healthy and sound mucous membrane appears to effectually prevent the active germs of the virus of contagious pleuro-pneumonia from entering the mucous and submucous tissues of the bowels, and there producing their characteristic local effects, it is very evident that the product of these germs, or their toxin, does gain an entrance to the circulation, and produces its specific effects on the system of the animal, giving it an immunity from the disease, although there is no local manifestation of diseased action. It would appear that intravenous injection of the virus gives the animal operated on an immunity from the disease in a similar manner.

It is interesting to note in this connection that although the active organism of pleuro-pneumonia fails to penetrate the healthy epithelium of the mucous membrane of the digestive canal, it is through the more delicate epithelium which lines the air cells of the lungs that ordinary infection takes place. But even in the lungs, it would appear that the germs of the disease gain an entrance only at certain points or centres, and the diseased action extends from these centres until the whole lung may become involved, so that even in the lungs the germs may enter only where there is a breach in the epithelium. It is further to be noted that in the large majority of cases the disease is confined to one lung, the other remaining unaffected excepting in the latter stages, when it may become affected by an extension of the disease from the primarily affected lung. Both lungs are often affected, however, from distinct centres.

The Mode of Infection, or the Manner in which a Healthy Susceptible Animal Contracts Pleuro-pneumonia.—All investigators and observers are agreed that the principal manner in which a susceptible animal contracts the disease, is by coming near enough to a living affected animal, to inhale the germs of the disease as they are expired from the lungs of the latter. The only difference of opinion is as to whether the disease can be contracted in any other way. Many observers maintain that it may be contracted from infected buildings, kraals, or pastures, from the manure of sick animals, or from the clothes of the attendants, and also from the carcases of animals which have died of the disease. There is, however, no direct experimental evidence that the disease can be contracted in any other manner than by inhaling the germs direct from a living affected animal.

It is quite true that the lymph obtained from the lungs of an affected animal may be preserved for months, and Laguerrière proved by inoculation that portions of an affected lung retained their infectiousness for more than a year, when kept at a temperature from 4° to 6° below zero. On the other hand it is a well-recognised fact that healthy uninoculated cattle may mix freely with inoculated cattle, even when extensive swellings follow the operation, and yet they invariably escape infection, if there are no diseased animals in the herd. Further, the experiment has frequently been made of placing the diseased lungs of newly slaughtered cattle in the feeding troughs of healthy cattle, but the results have always been negative.

It would appear, therefore, that although the micro-organism of pleuro-pneumonia possesses considerable vitality, and is capable, after many months, of producing the characteristic swellings when inoculated into any part of the connective tissue of a susceptible animal, there is no direct evidence to shew that the infective material preserved in any such manner is capable of gaining an entrance into the lungs of susceptible cattle in the ordinary way, and of giving rise to the disease. In expressing this opinion, my object is more to direct attention to the supreme importance of leaving no tainted animal in the herd, rather than to minimise the danger of infection from any other source.

What is the Best Method Practicable of Eradicating Pleuro-pneumonia from our Herds of Cattle?—There can be little doubt that the quickest and surest method of erdicating pleuro-pneumonia from our herds in the Colony, and in South Africa generally, would be to slaughter not alone the affected animals, but all the cattle that had been in contact with them. This is the method which was adopted in England and in every other country which has successfully stamped this disease out. But the pleuro-pneumonia of cattle is so widely prevalent amongst the cattle in our Native Territories, and there are various other reasons why such a measure could not be successfully carried out, that it need not be further considered.

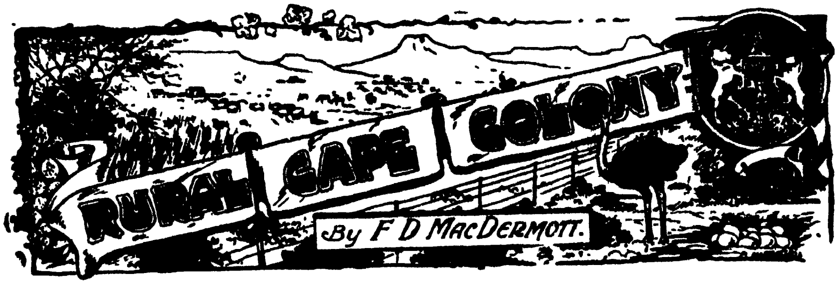
The only alternative measure, that offers any reasonable hope of success, is the immediate and strict quarantine of all infected herds, and the prompt isolation of all infected animals in such herds, followed by their compulsory slaughter. It would be necessary also to insist upon either the inoculation or drenching of the whole of the herd amongst which the disease appeared. There is no longer doubt respecting the efficiency of either inoculation or drenching as a preventive of the contagious lung-sickness of cattle, when the operations are properly carried out. I am well aware that many careful and closely observant cattle farmers, have been successful in arresting the spread of lung-sickness among their cattle, by the prompt slaughter of the affected animals, as soon as the slightest symptoms of the disease could be detected. But unless the disease is recognised early, the loss entailed in carrying out this method is sometimes very heavy, and the owner often hesitates when valuable animals become affected. For this reason, I am in favour of inoculation being resorted to immediately after the disease is detected.

The chief drawback to drenching as a practical measure for the early arrest of the disease, is the impossibility of obtaining sufficent fluid to drench a large herd until a number of animals have not only become affected, but reached the last stage of the disease. But whether inoculation or drenching is practised, it is equally necessary to success that no infection be left in the herd, and that can only be secured by killing every animal which becomes affected. I do not mean to infer that every animal which recovers from an attack of lung-sickness remains a source of infection for many months, and may be for years, but it is a fact that many cases do, and curiously enough it is the mildest cases which are the most dangerous.

As already remarked, the extent of lung tissue involved by the lesions of pleuro-pneumonia, in fatal cases, is very variable; the whole of one lung or the greater portion of both may be affected. In the latter cases the only limit to the extension of the disease would appear to be the amount of healthy lung tissue necessary for the continuance of life. In the large majority of those cases which recover, however, the disease is confined to one lung, and if the whole of this lung becomes involved—which it does frequently—the consolidated lobules rarely regain their normal condition after the absorption of the exudate; the general tendency is to degeneration and death of the lung tissue along with the exudate, and the gradual absorption of these degenerated products by the blood vessels and lymphatics, and their elimination by the ordinary excretory channels. All that remains in such cases, after complete recovery, is a mere shapeless shred of lung tissue firmly attached to the ribs by bands of fibrous tissue, while the unaffected lung is perfectly healthy and greatly increased in size. Such an animal would not be likely to convey infection to a herd after recovery is complete. There are many other cases in which a considerable portion, but not the whole, of one lung is involved in the diseased action. This diseased portion degenerates, dies, and is absorbed and eliminated in the same manner as the other, leaving a considerable portion of healthy lung, rather irregular in shape, with cicatrices or scars, indicating where the healthy lung tissue had come together and united, after the removal of the intervening dead portion, and the whole of this irregularly shaped healthy portion of lung is usually attached to the ribs with a variable number of small bands of fibrous tissue. There is no reason to believe that such cases would be capable of conveying infection of healthy susceptible cattle after recovery. It will be readily understood, however, that the appearance presented by the diseased lung in pleuro-pneumonia, even in cases analogous to the above, vary greatly, depending on the interval after recovery that the *post mortem* examination is made, and even when the examination is made many months after recovery is apparently complete, there are numerous cases in which the diseased and degenerated tissue is not wholly removed, old abscesses containing degenerated products in a semifluid condition are met with. *But these abscesses and cysts are usually so completely separated by* their surrounding membranes from the healthy lung tissue, that I do not think it likely that the lung so affected would be capable of giving out infection. But apart from these somewhat doubtful cases, there are many mild or abortive cases in which the progress of the disease in the lung is very slow, and appears to be arrested in its course after involving but a limited portion of one or both lungs. This diseased portion instead of undergoing a rapid process of degeneration, and ultimate removal from the lung, the disease appears to assume a chronic form, and the tissues undergo a process of low organisation, more especially around the borders of the diseased portion. In such cases the disease is apt to revive in the affected lung at an indefinite period after apparent recovery, and such animals are capable of conveying infection to any susceptible cattle with which they came into close contact. These are the cases which are represented as having contracted the disease a second time, but it would be more correct perhaps to say that the diseased action had never completely ceased in the affected lung. At any rate there can be no doubt that such mild and chronic cases are capable of conveying infection for many months, and even years after their apparent recovery, and as it is practically impossible, by an examination, made during the life of the recovered animals, to distinguish between those which are entirely free from infection, and those which are not, the only safe course to adopt is to kill every animal which manifests the slightest indications of being affected, and thus free the herd from further danger from within.

But it would be practically impossible to carry out such a measure of slaughter thoroughly without the cordial co-operation of the cattle owners of the Colony. In the first place, unless reasonable compensation were granted, owners would not promptly report outbreaks of the disease, but would try to conceal them as much as possible; and in the second place, the Stock Boards, composed as they are of farmers, would not enforce the immediate slaughter of affected animals, more especially the mild cases, which, as I have pointed out, are the most dangerous unless compensation was given.

If cattle owners were, however, certain of obtaining fair compensation for all affected cattle compulsorily slaughtered, on condition only that they reported every outbreak of pleuro-pneumonia as soon as it was observed, and on the other hand, they were made liable to a severe fine if they failed to do so, and in addition ran the risk of losing the compensation which they would otherwise have been entitled to; owners would have every inducement to report an outbreak of the disease among their cattle immediately it was observed; and as a further inducement to carry out effective inoculation, I would recommend fair compensation for the loss of any animals which die from the effects of the operation providing that it was performed by a certificated inoculator. The expense to the public revenue would not be great if these measures were carried out promptly; in fact they would be very little in comparison to the loss annually sustained by the ravages of the disease.



NO. XVII.

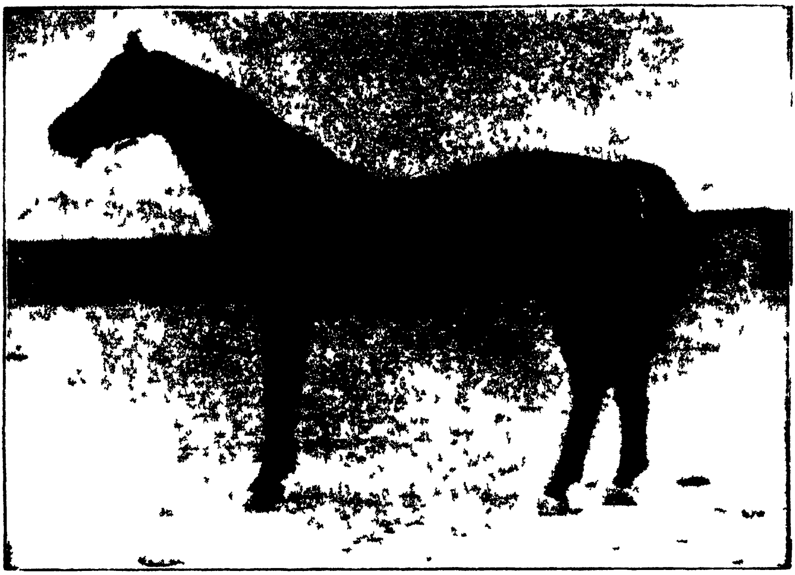
THE DISTRICT OF COLESBERG.

(*Continued from page 660*)

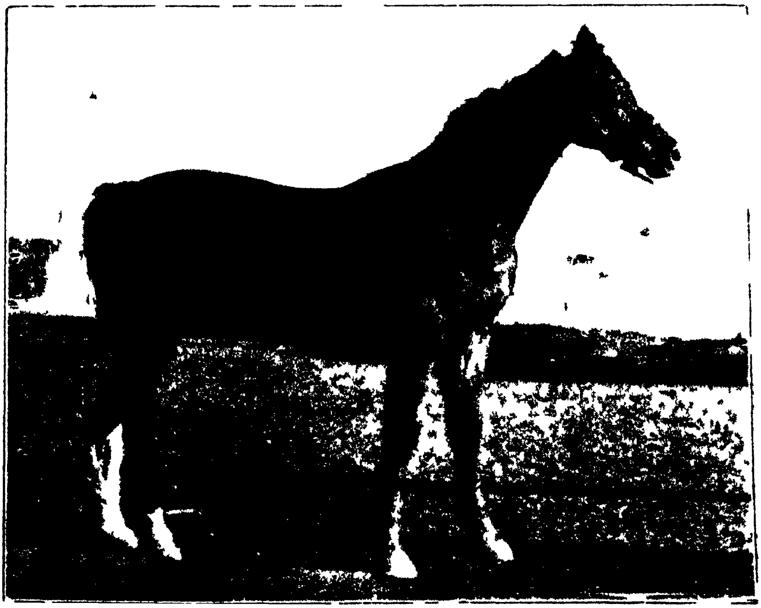
Those acquainted with the District of Colesberg will realise that to visit it farm by farm with the object of giving descriptions of each property would call for more space than is at my disposal for these articles. If I can succeed in placing before my readers anything like an adequate idea of the possibilities and actualities of the farming industries of that section I shall have succeeded in my object, and to do that satisfactorily it was absolutely necessary for me to visit the leading and more important farmers, but I could do little more. Fortunately, the conditions of the district are such that there are few striking differences in the types of farming carried on, so that, with the notable exceptions where the more enterprising are introducing better appliances and more modern ideas, the typical places I have visited give a very fair idea of the whole. There are, unfortunately, a good many that are backward and, from one cause or another, do not progress with the times. In some cases it was want of capital, the great handicap to so many of our agriculturists and pastoralists; in others, again, misfortune has held people back, and, as these for the greater part are men who have lived so long in the old ways that it would have been difficult, in any case, for them to have moved on modern lines, it is very doubtful if the district as a whole will fully recover for some years to come yet. On my way to

Mr. Alec Robertson's Farm, "Stormfontein,"

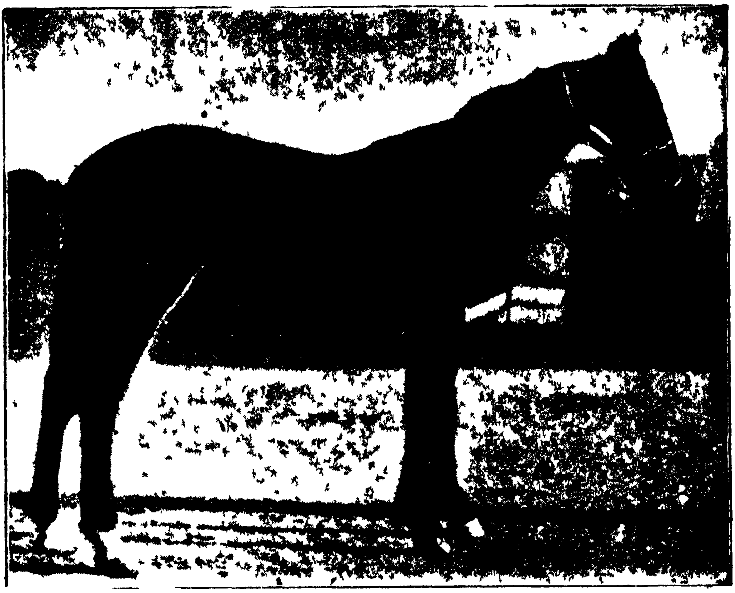
the next property I visited, I saw signs that more than convinced me that a great deal of this leeway has yet to be made up. But on every hand there were indications that give encouragement. Men may be backward, but it is impossible for such a country to stand



Thoroughbred Stallion, "Uniform."



Chestnut Colt by "Uniform" out of "Golden Knot."



'Uniform" Filly out of "Talky Talky"

"Golden Knot" with Colt "Aiguillette," by "Uniform."

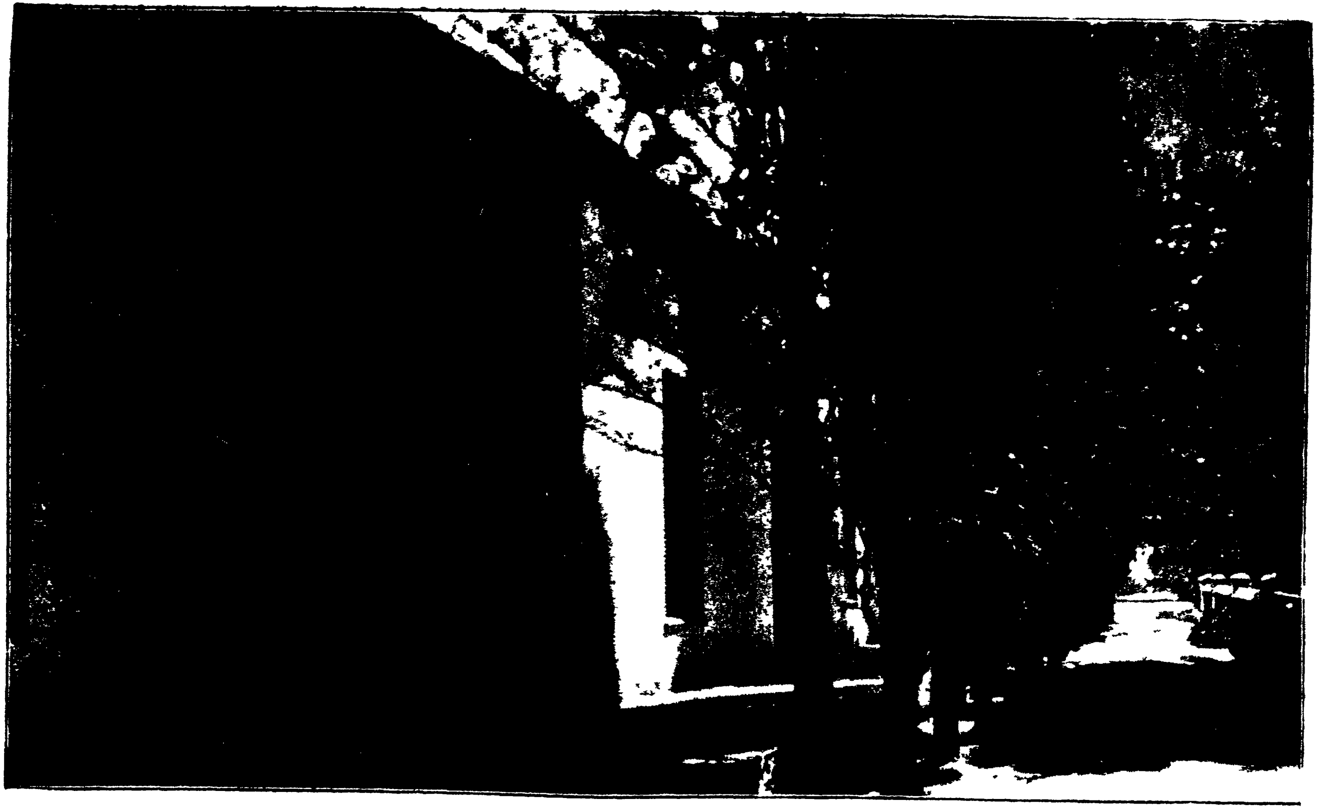
still. Mr. Alec Robertson's well-managed establishment, however, soon dispels all thoughts of stagnation, for here is to be found one of the show places of the district. Mr. Robertson is better known as a breeder and owner of thoroughbred racing stock than as a farmer, that is, to those outside the Colesberg district, and I shall attempt, therefore, first of all, to deal with that side of Stormfontein. The first thing that strikes one on approaching the homestead is the large array of roomy and comfortable-looking out-buildings, ranged behind the modest-looking dwelling house. But on closer acquaintance the dwelling takes on proportions which are a little surprising, and the interior is comfort itself. The out-buildings, when they are examined nearer, turn out to be excellently-ordered stables and storehouses, with stalls, etc., for the stock. There are long ranges of loose boxes and covered kraals for the accommodation of the thoroughbreds with plenty of shelter shedding for cattle and sheep in the winter. The latter is found necessary here, for the cold is frequently intense as I found on more than one bright sharp morning while trying to manipulate the camera with a restless horse before me. It is a dry cold, but none the less searching for that, and one of the sights of Stormfontein is to see how it affects the youngsters when they are let loose for a run by themselves before breakfast. To see from fifteen to twenty thoroughbred colts galloping about the veld like wildlings in the bright sunshine is not soon forgotten.

This farm is situated in the Lower Hantam, more towards the Orange River than any of the properties I had previously visited, and as Mr. Robertson is one of the older horse breeders of the district, I had the opportunity of hearing a good deal of the virtues of the Hantam horse from one who may be said to have been very intimately associated with that very excellent animal. And it is gratifying to learn that there is every prospect of the breed being revived so soon as suitable mares are once more available. But, as Mr. Robertson remarked, this takes time; you cannot re-establish a breed of horses in a month. With the introduction of such excellent blood into the district, however, the day should not be far off when the old glories are revived.

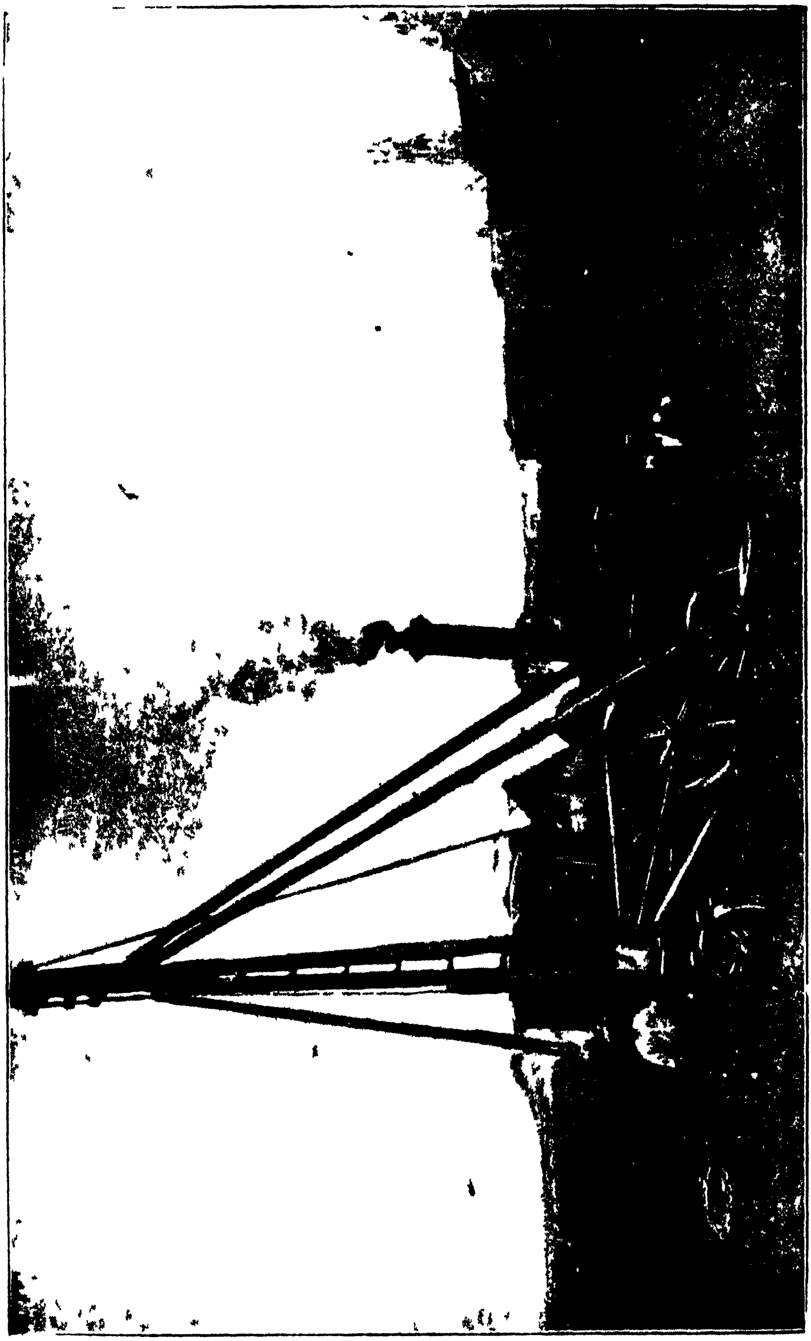
I had not been long on the farm when I was taken round the stables and shewn the thoroughbred stock. First on the list, and well he deserves pride of place, stands "Uniform," a stallion from which much is expected. If one can judge by the appearance of the progeny there is every prospect of his justifying all that is expected, for a better looking lot of youngsters it is difficult to imagine. They are all healthy and particularly well set up while they are filling out most satisfactorily as they grow, and their limbs are as strong and clean as one could desire. I managed to secure some snap-shots of some of them which are reproduced herewith. "Uniform" comes from the well-known "Musket," stock, being by "Hotchkiss" out of "Forma," the latter being the dam of "Multiform" and "Cruciform." His best performance on the turf was when he won the New Zealand Derby, carrying 9st. The mares and foals shown in the illustrations herewith speak for themselves. The chestnut colt by "Uniform" out of "Golden Knot," is quite a little aristocrat, while the filly by "Uniform" out of the mare "Talky-Talky" is rather better than she looks in the photograph. The one that took my fancy most was "Aiguilette," by "Uniform" out of "Golden Knot," but being so young it is difficult to form a very decided opinion. The mare "Nunnery" is also among the breeding stock at this farm and several other valuable animals, all looking the picture of health. The reason of this was not very far to seek.

The farm is situated in a well sheltered hollow with plenty of good vlei land for grazing. The veld is mixed karoo and grass and in good seasons yields excellent feed, but with so much valuable stock on hand, Mr. Robertson cannot afford to take any risks, so he has sown a large stretch of the vlei with lucerne and other grasses which are kept in good order by water from perennial springs on the property. Unlike so many of the farmers hereabouts Mr. Robertson is not quite so keen on developing supplies of water from below the surface. He knows that he could do so with comparative ease, but he prefers to wait until he sees what the result is going to be on those properties where this work is being carried on. He holds a theory that the development of underground water may react injuriously by draining the subsoil and thus removing the natural moisture which now maintains the karoo bushes through the worst of droughts. It may be, of course, that Mr. Robertson does not as yet feel the necessity of seeking underground waters so much as some of his neighbours do who are not quite so fortunately placed; but as there may be, on the other hand, something in his theory, more particularly when one sees such large supplies drawn from so close to the surface, it will be interesting to watch results. One thing is certain, and that is that Mr. Robertson does not lag behind in matters of this sort when he sees the necessity of moving forward, so we may rest assured that the moment he realises that his theories are likely to be disproved he will soon change his mind.

Stormfontein used at one time to carry a large flock of Merino sheep, but Mr. Robertson has been compelled to abandon them in favour of the now ubiquitous cross-bred Persian. There are few farms in he Colesberg District where Persians of sorts are not reared, and the woolled varieties of sheep more or less discredited just now. But no one that I met quite so frankly gave up the Merino as "nearly impossible" as did Mr. Robertson. His reasons seem fairly sound, too. His trouble is the "steek-grass," which ruined his clip of wool. There is no doubt that this is a serious handicap to the wool farmer, for where it appears there is little hope for the wool crop. But "steek-grass" is not going to remain with us for ever; it has been quite as troublesome in other districts after prolonged droughts and when the rains have returned very little has been heard of it again. But in the meanwhile farmers like Mr. Robertson have an advantage now, for they can turn to the Persian and find both salvation and profit at the same time. The Persian does wonderfully



"Buffels Vlei," the Homestead of Mr. F. van Zy



Water Drilling at Kuilfontein

well in these parts, in fact it seems to thrive like the proverbial green bay tree. Two animals shewn to me by Mr. Robertson scaled no less than 318 lbs. between them, live weight. One turned the scale at 158 lbs, the other at 160 lbs. And all this with no extra feed; whatever they put on they picked up out of the veld. When this sort of thing can be done, and the early maturity of these cross-breds is taken into consideration, it is not to be wondered at that men are abandoning merinoes in their favour. It is disappointing, in a sense, to see the wool crop going back; but after all even the farmer has to think of the present as well as the future; and, as many of them argue, it is all very well to say that the merino is a sounder farming proposition in the long run, but with the Persian an immediate profit is realisable with but a fraction of the trouble, and, practically speaking, no risk.

Cattle are not an important interest on this farm; ostriches are not a strong feature either—in fact there are scarcely any. But poultry is evidently going to be a big thing; for here again I saw some splendid specimens, particularly of turkeys, guinea fowls, and Minorcas. The egg crop, the particular care of Mrs. Robertson, must be something considerable in the course of the year, and as the precaution is taken of preserving the surplus production in the good seasons, in water-glass, there is very little loss. The poultry are put to other uses on this interesting property, as well as those ordinarily expected of the domestic hen. Locusts are frequently very troublesome, and as they settle in the veld the poultry are turned out on them. It is difficult, of course, to get a flock of turkeys, for instance, to travel a half a mile or so to tackle a swarm of locusts. But this difficulty is overcome by a little persuasion. The turkeys are led to the field of operations by the following simple device: A man walks in front with a few mealies in a bag. As he walks slowly on he drops the mealies, and the birds follow picking them up. By this means the ground is soon covered, and once they get among the locusts there is no need to offer any further inducements. If they do not destroy them all they so hustle them about that the locusts are glad enough to shift their camp as soon as possible. That is one version. But I must say that there are others. One sceptic to whom I related this simple method of getting rid of locusts smiled very broadly. When I asked him what he was smiling at, he replied, "I was just thinking of a sight I saw only this morning. A swarm of locusts had descended close to a fine flock of turkeys, and for a time the birds had a great feast. But after a while they began to look tired, and when I left there was no apparent diminution in the locusts, but the unfortunate turkeys were all huddled up in a confused heap against a kraal wall looking as dazed and astonished as any decently reared turkey could look. It evidently didn't work in that case." I have to admit that I sympathised with the smile.

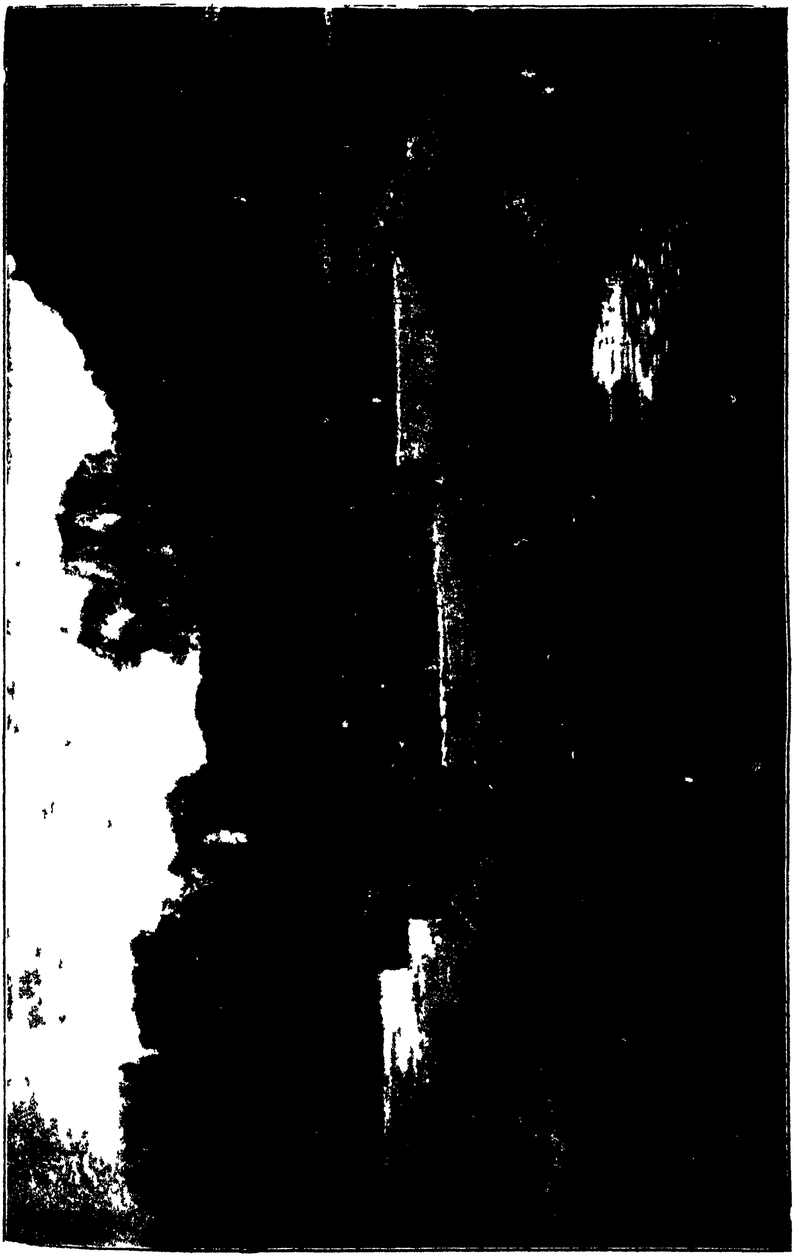
In the lands in front of the homestead there is also a well-kept orchard, which looked very well when I was there, though it was the depth of winter. Excellent pears are grown here, principally of the

Bon Chretien and Marie Louise varieties, these being mostly old stocks worked over to the imported varieties. Apples thrive wonderfully well here, and I should not be surprised to hear of something big being done in these fruits in the course of a year or two. Other fruits are doubtful owing to frost and occasional hail, but Mrs. Robertson is justifiably proud of a very fine collection of preserved stone fruits which would compare favourably with any district. The peaches produced here are the old yellow fleshed varieties, but there is no reason why others should not do as well.

I have mentioned above something of the lucerne and grasses grown in the vley lands, most of which seem establishing themselves well. Lucerne thrives as a matter of course. On such a soil it is only a matter of cultivation. But the grasses are largely experimental, and it is very gratifying to notice the results which are being obtained. *Paspalum dilatatum* has been sown out in experimental plots, and promises to make a show later on; perennial rye grasses too, seem to give hope for the future; but what is wanted there more than all is a natural blue grass which is indigenous to the vley. This is described as a most valuable grass, and as it is indigenous to the district no effort should be spared in its cultivation. These indigenous grasses are like our karoo bushes, invaluable, if we only knew it; no imported plants can equal them.

MR. F. VAN ZYL'S FARM, "BUFFEL'S VLEI."

Returning by way of Holle River I found myself in the town of Colesberg where I had the pleasure of attending a meeting of the local Farmers' Association, a most progressive and intelligent body of men. In the course of the meeting several subjects of vital importance to the farmers of the District were debated, among them being a proposition to form an Agricultural Society and arrange for an annual show. No more valuable suggestion could be made for this District, for it would then soon be seen how productive it is, and how very much more productive it could be made. The next morning I took a run out to "Buffel's Vlei," the farm of Mr. "Frikkie" van Zyl. This property is situated within half an hour's drive of the town and borders on the commonage. As can be gathered from the name of the farm its chief characteristic is an enormous stretch of vlei which must produce magnificent grazing in good seasons. Prior to the great drought a large number of cattle and small stock used to be carried on this property but during the past few years the grazing capacity of the farm has gradually diminished until now it is very considerably reduced compared to what it used to be. But in spite of this the capacity of the farm is still a long way above the average. The reason of this is the energetic manner in which the proprietor has set to work to develop the underground waters. And not satisfied with what he has done already, he still continues with that work and is more than satisfied with the results. In the course of these developing works he has opened up long trenches of some depth in the water-bearing strata



Irrigation Works at Grootfontein

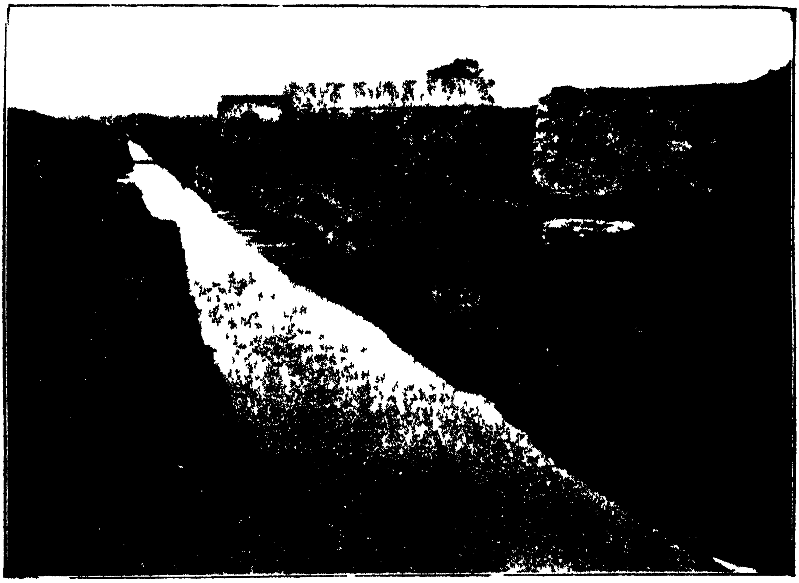
Two views of the construction of the Great Dam at Grootfontein and thus increased the available supply very considerably. This he lifts to the surface by means of windmills, or air-motors, working bucket and lift pumps, and in addition he has a 12 horse-power petroleum engine at work driving pumps that lift a six inch head of water. All this water is then gravitated for the better part of a mile to the homestead where the distributing or "lead" dam is situated. Further back in the hills more development work is being carried out and water is being found in most unlikely spots. In one of the short kloofs, Mr. Van Zyl told me, a very strong water has been struck upon which the pumps seem to make no impression whatever. Incidentally it may be mentioned that in the course of these explorations several samples of mineral ore, more or less valuable, have been turned up, but no one as yet knows whether the deposits are payable or not.

On going through the farm on the cultural side the first outstanding feature to attract attention was the really splendid condition in which everything on the place seemed to be. The lucerne, of which there is a very large stretch, was a picture. Splendidly grown, heavy, bright-looking crops they all are, and it was not surprising to learn that as many as seven cuts a year are far from uncommon. The water supply is plentiful, the soil is richness itself, and the cultivator is a man who takes an intelligent pride in all he does; so there is not much room for improvement here—unless it takes the form of more extensive cultivation. The lucerne fields were beautifully clean and reflected the greatest credit on their owner. In the same section of the farm there is a very good orchard which gives an excellent return year by year. And another one is being laid out on the opposite side of the valley, which goes to shew that fruit is sufficiently promising to encourage people to extend their orchards. A small vineyard is also a prominent feature of the place, and as the vines were looking very well at the time of my visit it is to be presumed they are an asset of some value in the right season. The fruits which do best here are apples, pears, peaches, and a few of the other stone fruits. Blight is troublesome on some of the apple trees which are evidently not on blight-proof stocks. But no serious damage has as yet been noticed. There are some loquat trees in the orchard but these do not stand the frost very well and are soon nipped off.

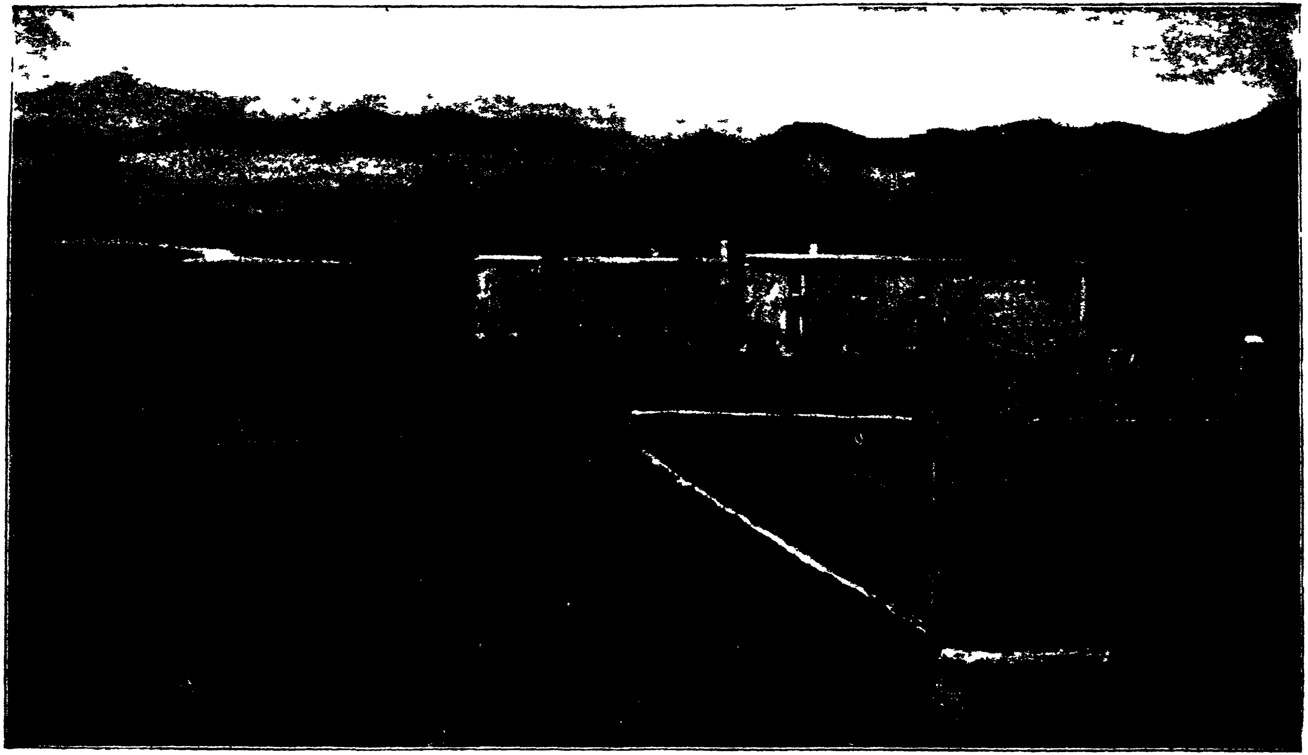
The stock side of the farm is represented by some excellent cattle which have been in the district for a long time. There seems to be a good deal of Friesland blood in most of them this being the strain mostly favoured in these parts. The inevitable Persian sheep is also a prominent feature of the landscape, while an excellent flock of some 3,000 Angora goats shews that the mohair industry might easily be extended in this district with advantage and profit. Ostriches and horses make up the balance on the stock side, each excellent and of a type which might well be copied with advantage. In fact, wherever one turns in this district the splendid appearance of every class of stock that is given anything like a chance shews how rich the natural conditions are. I may mention that in the orchards at Buffel's Vlei there is an excellent growth of perennial Rye grass. It may not be a good thing for the orchard from the theoretical point of view but it makes a beautiful setting for the trees, and gives good feed for the stock when the other grasses are dry. Buffel's Vlei is an interesting spot at the close of a long period of drought, what it may be after a couple of really good seasons can be better imagined than described. In connection with the water on the farm the theory most strongly held is that the vein comes through from the Orange River some miles away. It seems fairly grounded, for the formation seems to indicate the flow of a wide area of drainage past this spot. It may be, of course, that the waters which are developed on this farm are flowing towards the Orange River in the ordinary course of drainage. But no evidence has been collected calculated to prove or disprove either theory.

MR. H. PLEWMAN'S FARM, "KUILFONTEIN."

Returning to Colesberg, I started in another direction with the ultimate object of again striking the railway at Arundel, and then crossing over in an easterly direction in order to see some of the work which is being carried out on the higher parts of the Oorlog Spruit. This trip took me past Mr. H. Plewman's farm at Kuilfontein. Here I found myself on a typical sheep farm with as much interest being taken in the development of water as on any of the other farms I had visited. The only difference was that the jumper drill was at work probing the earth with a six-inch bore in an endeavour to add to the flow of the natural springs on the property. The strongest water on the farm is a spring that is known as an old Bushman fountain. This goes on for ever at the same old pace. It is neither to be hurried nor retarded, but with a regular flow that is really invaluable gives sufficient water to supply all domestic needs and a good deal over for irrigation purposes. Along the depression where the water from the spring would naturally makes its way, the soil is a rich, black loam, and in this a good deal is done in the shape of raising cereals, lucerne, and fruit, as well as potatoes and other vegetables for the homestead. But this is not considered sufficient. It is hoped that by means of the drill the water supply will be so increased that a much larger proportion of land will be brought under permanent crops, particularly lucerne. The property is a fairly old-established one, having been in the hands of the Plewman family for some years past. The sheep which form the staple product of the farm—the main crops being wool and mutton—are mostly of the Rambouillet type on the wool raising side. The mutton crop is raised from cross-bred Persians. These Rambouillets were originally introduced by the elder Mr. Plewman, some twenty-five years ago, and have been kept true to the original type ever since, with the result that the Kuilfontein clip is thoroughly well known in the district. To shew the extent of the sheep industry here and as an indication of the care which is taken of the woolled flocks, I may mention that there is a splendid range of stone built shedding equal to accommodate some 2,000 ewes when the lambing season comes round. The provision of shelter is an absolute necessity for stock in this exposed high veld, and it is gratifying to see so many of the stockmen recognising its value. Without shelter the losses in the lambing season would be something enormous, especially on a large farm like this where it is open to the depredations of jackals, for they have not as yet got to the lengths of woven fences. The nearest approach I saw to such a thing was on Mr. Van Zyl's farm, Buffel's Vlei, where he was putting up some lengths of an American made woven fence that he claimed was jackal-proof. It is made up in rolls like wire netting and erected with very little trouble. Mr. Van Zyl told me he procured it in Port Elizabeth. It is called Lamb's fence. There is no doubt that as the flocks extend, and there is every sign of that desirable consummation becoming realised in a very short time, the question of fencing will enter the acute phase. As it is, the jackal is a serious consideration, for he roams the veld with impunity. It is no uncommon sight when driving from farm to farm to spot Mr. Jackal quietly seated in the veld watching your movements, and, no doubt, calculating how best he can arrange a mutton feast before the baas returns in his buggy to find his gun. A good deal of poisoning is done by many farmers, but the jackal is becoming as well instructed as to the flavour of poisoned baits as the person who lays them. The most successful poisoning is done in the shooting season, when the



A Furrow at Grootfontein.



Mr Oosthuizen's homestead at Vlakfontein with Kraals in the foreground jackals will greedily attack the offal left by the shooters. On such occasions now, nearly all the farmers who have shooting on their farms carry with them some poison, and as the buck are dressed, after being shot, the remaining offal is carefully poisoned and left for the jackals to feast on. By this means a good many are accounted for, but so long as there is plenty of food in the shape of mutton there will always be jackals until they are driven out entirely by fencing.

The Persian is not treated quite so generously on this farm as on some others, for though he is recognised as a necessity he is not glorified above the merino. The flocks are kept carefully apart, and the cross-breds used largely for butchering purposes. So prolific and hardy is this strain that old merino ewes supposed to be past the breeding age will invariably throw at least one lamb to the Persian if allowed to run with the ram for a while. They are sent out to distant parts of the farm in small flocks, and jackals or no jackals, it is seldom that the ewes return without at least one lamb at their heels. This is the last service expected of the ewe, and when breeding sheep have reached six and seven years old one cannot expect very much more of them. There is not much in the shape of forest trees about the farm, but an attempt has been made to grow firewood, the Tamarisk being found fairly suitable for that purpose. The fruit is only grown for the use of the homestead.

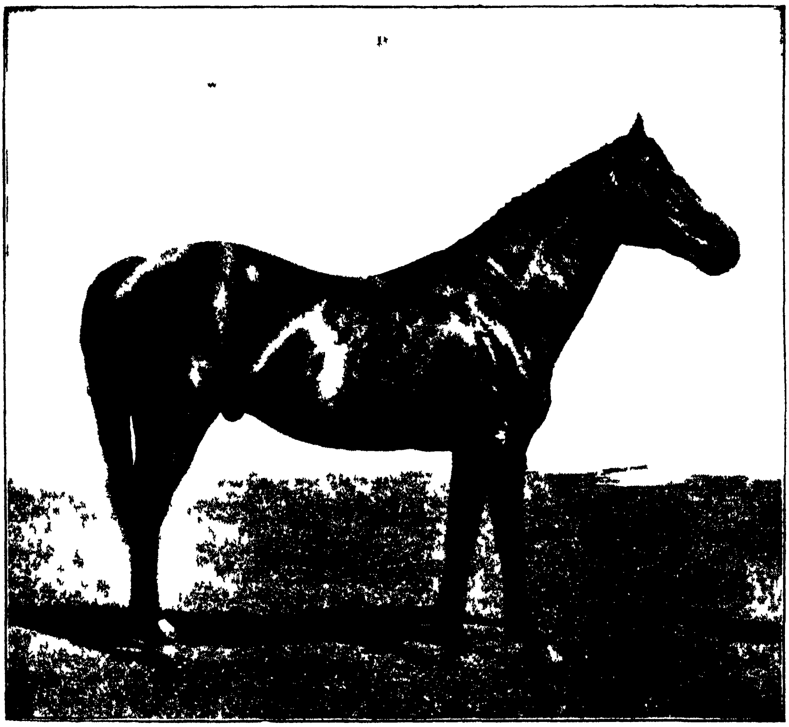
POTATOES UNDER IRRIGATION AT "MISKUITFONTEIN."

The next farm I looked in upon is one that is, comparatively speaking, new. That is to say, the farm is as old as any other in the district, but is now being developed on lines that seem new to the majority of the cultivators of this section. I made the acquaintance of the present owner, Mr. Andries van der Merwe, at the Farmers' Association meeting in Colesberg. He is president of that institution, and an excellent president he makes. That, however, is beside the point. Being interested in all that pertains to progress, I was naturally desirous to see something of the work done by a farmer occupying so prominent a position.

"Miskuitfontein," when it was taken over by Mr. van der Merwe, was in a far from prosperous condition. In fact, it would not be going too far to say that it was practically ruined, so our energetic friend had to set himself the task of completely re-establishing the property as a farm. The first consideration in these districts is that of water. There was a little permanent water on the property, but not nearly sufficient to satisfy the present proprietor. After some thought, he decided to try as near the homestead as possible, and was fortunate in striking a supply quite close to the house which now gives some 60,000 gals. of beautiful clear water per diem within twenty feet of the surface. This he promptly proceeded to utilise, and, with the addition of the other spring, has laid out a very large stretch of arable land. In addition to the work of development which gave him the water Mr. Van der Merwe had just completed a large cement tank to hold some 52,000 gals. which he will hold in reserve, so as to have his supply under control. The motive power is a 16-ft. "Dandy" windmill which he finds works very satisfactorily, delivering through a four-inch pipe. The making of the cement tank—or dam, as it is called—did not prove a very easy job. It was built by Mr. Van der Merwe himself, of rough stones which had to be ridden some distance from the adjoining kopjes. These are set in cement to form the walls; the floor is formed of the same material cemented over. He first tried to set the floor in lime plaster, but found it would not hold long enough for the structure to set, but cracked under the frosts. This compelled him to use cement, and that settled the trouble. The tank is to be used as the distributing dam for the whole of the lands and at the same time supply domestic water to the house. It is situated sufficiently high to answer this purpose by gravitation, so that a great deal of labour is saved. As water is a valuable commodity in such conditions a good deal of piping is used instead of open furrows, but the water is led on to the lands by the latter means. The main crop of this farm, so far as I could gather, is potatoes which pay very well here owing to the fertility of the soil, particularly in the lower-lying vlei lands. The lands vary in productiveness, of course; some of the better portions yielding as high a return as fifteen to one, while others again return ten to one. The average planting at present runs to about 150 bags of seed. Being so close to the larger markets of the north, prices can generally be estimated on a fairly remunerative basis, while in times of scarcity they naturally rule high. So that taken all round tho proposition seems a sound one. The only serious trouble seems to be the tuber moth, but the damage this pest might cause is usually obviated by care in cultivation. Mr. Van der Merwe has found for himself that by deep planting and hilling his losses are very small indeed. If others who suffer from the ravages of this pest would follow in his footsteps they would find it pay very well. The other precaution to be taken is to destroy all refuse from the fields so soon as possible, such as the dead haulms, &c., and bruised and defective tubers, at the same time keeping the seed well covered so that the moth has nothing upon which to lay its eggs. These simple precautions are found to be quite effective where they have been tried, and the resulting increase in the crops is remarkable. The other crops produced on this farm include oats, and barley, while lucerne is being laid down. In time this property should carry heavy crops of lucerne when doubtless more stock will be kept. It is more an agricultural than a stock farm at present but the conditions are all so admirably suited for stock that this side is bound to advance with further development. The property is very bare and exposed at present. and shelter is very much needed. To supply this deficiency Mr. Van der Merwe is carrying on tree planting, putting in several varieties of eucalypts, and a large number of the Karee, (Rhus viminalis) an indigenous tree of slow growth but giving very sound timber. It grows well along the Orange River in places and it is expected to do well here.

THE OORLOG SPRUIT AGAIN.

Starting once more from Arundel I made my way across country through Ventersfontein in the direction of the upper portion of the Oorlog Spruit where I heard some very extensive irrigation and development works were being carried out. On the way I called upon Mr. Maskell at Klipfontein, who, in his way, is also doing big things in the way of development. There I found an excellent stock farm with plenty of water, largely developed from underground supplies and by stopping the flood waters from running off to the sea. It is really wonderful the amount of water thus conserved in these parts. In fact it may be said that nearly every successful farmer owes his all to work of this description. Here one can see acres and acres of flourishing lucerne and other crops all owing their existence to the damming back and conservation of the intermittent spruits and sluits. There are hundreds of acres of arable land just



Thoroughbred Stallion "Carrick"

"Hanglip," the homestead of Mr H. van Zyl waiting to be brought under water and as all the sluits are being gradually reclaimed and the flood waters thus thrown out over the veld there can be little doubt as to the future of such a property. The value of lucerne in such a country needs no demonstration. Every farmer who can grow a patch promptly plants it. If its value needed any demonstration one visit to Klipfontein should suffice. Splendid flocks of ostriches are to be seen grazing in the lands while other sections are reserved for the mower. Sheep and cattle too are plentiful and all in the pink of condition. My one regret is that I could not stay longer here, but my time was getting short and I had a good deal of ground to cover within the following few days so was compelled to curtail my visit.

In continuing my journey I passed through the farms Rietkuil, Poortje, and Zeekoegat, where Mr. Pienaar was busy building a large dam to store flood waters. From there I reached one of the biggest propositions in the district and one upon which some most important and valuable works are being carried out. This property is known as

"Grootfontein," belonging to Mr. C. Rissik.

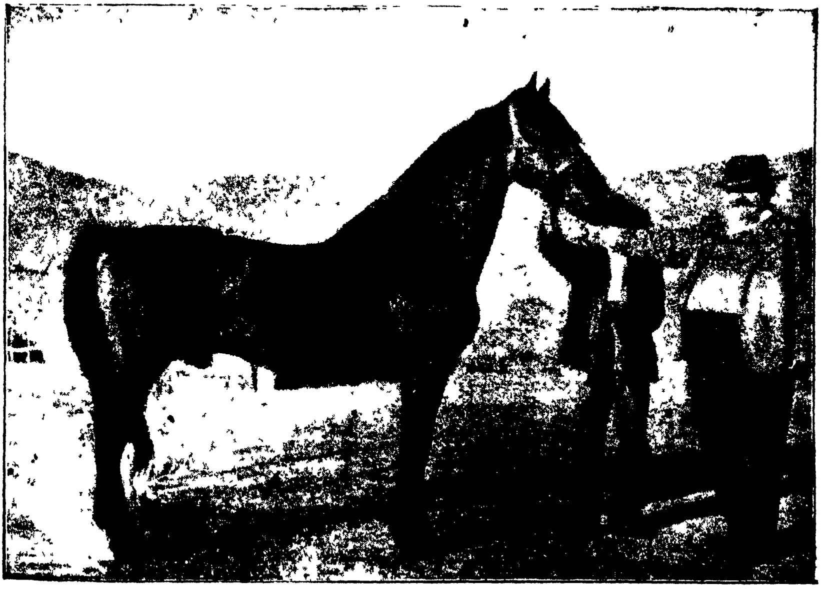
The proprietor has been attracted to this district like others who have amassed fortunes at the goldfields. But while the natural advantages offered for horse-breeding seem to have largely influenced others, Mr. Rissik seems to have been satisfied with the prospect of creating a valuable agricultural estate. This farm—" Grootfontein " —is, as its names implies, blessed with a wonderful fountain of water—or spring—which has never been known to fail. It is peculiarly situated. In a former part of this article I have mentioned the basin-like depressions which occur in this section. Grootfontein comprises a large portion of two of these basins. The upper one includes a catchment area of something like fifty square miles, and the greater part of the drainage from this area seems to pass through a narrow poort or valley, in the shape of the spring mentioned above, on to the lower section which opens out below and stretches in an enormous sloping flat right down to the Oorlog Spruit. The farm covers some 12,000 morgen, and of this it is estimated that several hundred morgen of good land can be brought under irrigation and of these at least 300 will carry lucerne. The normal flow of the spring is about 200,000 gals. per diem, and it is hoped by means of the works now in course of construction to increase this. If they do not actually increase the flow of the spring they are bound to render available a very large quantity of flood water which is lost at present. The farm is only partly stocked as yet, the total being some 3,500 head large and small.

The illustrations herewith give some idea of what is being done, but it is manifesly impossible to show on a small camera works which extend over so large an area. The scheme now being worked out is roughly as follows: In the upper basin, mentioned above, the land in the past has been badly cut up into sluits by the action of storm waters. To prevent this a number of small earthen dams—twelve in all—have been constructed at intervals across the waterways with the object first of throwing the floodwaters on to the veld, and thus stop the erosion and secondly to act as silt dams for a much larger work lower down. This larger work consists of an earthen dam some 1,500 yards long, about 45 ft. high, in the highest part, and 80 ft. wide which is thrown across the valley to arrest the flood waters, and retain them for use. When completed the wall will be faced inside with rough stone work, and when full it is estimated that it will form a lake some hundreds of acres in extent.

These works are all being constructed at a level much higher than that at which the great spring rises. In the poort, where the spring passes through, a cement dam is being constructed, as shewn in the illustrations, in order to be able to control all the irrigation waters from this one point. The wall here is carried down sixteen feet and set on the solid rock as are all the works so far as I could gather. In addition to these there are masonry weirs in the Oorlog Spruit, which are calculated to give a good supply of water for the lower-lying lands, and large dams in other parts of the farm. The irrigation furrows are all on the grand scale, many of them being cut through the rock and varying from ten to six feet in width.

What all this means can only be fully realised after going over the property, for it is difficult to describe works on so large a scale without running the risk of being charged with exaggeration. What the ultimate object of it all may be is not quite decided yet. But in any case it should stand as an object lesson to others. It is very certain that for this huge property to be worked as an agricultural or pastoral proposition under one management would call for exceptional gifts, and be a terrible tax on any individual. The suggestion has been thrown out that it is to be run as a huge ostrich and cattle farm. But this seems far from probable, as it would involve the employment of so large a capital in addition to that already expended. But if it could be so arranged as to allow of tenants settling on small allotments of arable land with grazing rights for stock, there should be little difficulty in organising one of the grandest agricultural settlements for its size in South Africa. The lands would be well worth a big rental if the water supply were assured, and it would not take long for a thriving community to spring up that would be a credit to the owner of the property, and a grand commercial asset to the country as well. There are so few places in this country where such schemes can be handled successfully that it seems a pity so promising a chance should be missed. I understand that Mr. Rissik intends building a dwelling there and settling down to farming on the grand scale sketched above. It is to be hoped he may do this, but it should not debar him from entertaining the potentialities involved in the tenant-farmer scheme here outlined. The whole of the works are being carried out by Mr. H. W. Fourie, a genial irrigation farmer from Oudtshoorn, who has had a life's experience of such matters. So far he seems to have done remarkably well, and for the sake of others who may be contemplating something of the sort, I

Thoroughbred Stallion "Simonwick.



Cleveland Stallion "Wellington."

Site for Weir on Zuurberg Spruit to divert flood waters being constructed by Mr P M Southey son of Mr. Wm. Southey of Schoombie, Mr. H. Elliott, of Cathcart, and others who have settled down there. I found Mr. Percy Southey busy with a scheme for bringing out the flood waters of the spruit and spreading them over the better part of a couple of farms; and the two Barbers proud in the fact that they possess some of the finest ostriches in the district. Of course they all have other interests besides these. The flooding scheme of Mr. Southey is now getting on well towards a finish, the diverting weir, (a photograph of the site being given herewith,) being nearly built, and the furrow, about twenty feet wide and the better part of a couple of miles long, being also nearly ready. It is a splendid inception, and well worthy of the son of the man who created "Varkenskop." Mr. Elliott, too, has some excellent flooding and irrigating works on his property which will be very valuable as he gets more lucerne laid down. The two Barbers—Mr. Charles Barber, and Mr. H. M. Barber—are much higher up the spruit, and they have their own schemes which also involve the bringing under irrigation of large tracts of arable land which now lie idle. They have managed to get a good deal of water from the Spruit by care and conservation, but so much more has yet to be done, that they scarcely know where to begin. The Zuurberg Spruit has a magnificent catchment area—right away from the Zuurberg Mountains in the south—and there is very little doubt as to this being a most important section for irrigation works in the immediate future. I hope to be able later on to pay a special visit to this part of the country when I expect to have some important works to describe.

EASTERN PROVINCE HORTICULTURAL BOARD.

Meeting at Komgha.

A meeting of the Eastern Province Horticultural Board was held in the Library, Komgha, on September 8, the vice-President, Mr. J. Leighton. F.R.H.S., being in the chair. There were also present, Messrs. H. Flanagan (Komgha), P. Kruuse (East London), Langfield (Queenstown), Landrey (Lower Cathcart), Oats (Bathurst), Lothian (Stutterheim), C. P. Lounsbury (Government Entomologist), M. Tindale (delegate from East London), and the secretary, Mr. W. Goulden. The minutes of the previous meeting having been read and passed,

The Mayor of Komgha, Mr. J. Bryson, on behalf of the Council and citzens of Komgha, extended a hearty welcome to the Board and wished them every success.

Mr. Attorney Campbell expressed the pleasure of the Library committee in being able to place the Library at their disposal.

Business arising out of Minutes.—A letter was read *re* the exhibition of colonial fruits, etc., in London, and the secretary was instructed to forward copies to the representatives.

Visit of Fruit Experts.—A letter was read stating that the Government would issue instructions notifying the visits, and one was also from the C.C. saying that the exact date of Mr. Pillans's visit would be submitted later on. Several members expressed their dissatisfaction at the way Mr. Pillans arranged his visits, and of the shortness of his stay. The matter was then allowed to stand over.

Government Grant.—The secretary read a letter from the Department of Agriculture stating that Government had handed over the whole of the grant, viz. £125, to the Board. This amount had been placed to the credit of the Board, and arrangements had been made that cheques drawn against it must bear the signatures of chairman and secretary of the Board. The meeting confirmed the action of the president and secretary in the matter.

The question of the allowing the Board to frank its letters and telegrams was allowed to drop.

Guano Depot.—It was resolved to reaffirm the resolution of last Congress: "That a guano depot be established at East London, and that the guano be sold in the East London stores at the same price as in the stores at Capetown."

Codlin Moth.—Letters were read from various centres asking that immediate action be taken to stop the spread of the codlin moth. The meeting decided that the matter be left in the hands of Mr. Lounsbury, who promised to attend to it immediately he reached Cape Town.

Fruit-Growers' Requisites.—The secretary was instructed to make enquiries and submit information to representatives.

Resignation of Mr. Malley.—*Re* the resignation of Mr. C. W. Malley, Government Entomologist at Grahamstown, it was decided to express the deep regret of the Association, and to urge him to, reconsider his decision.

The accounts were then passed, and it was decided to hold the next meeting at King William's Town, on December 4.

Votes of thanks were then passed to the Mayor and Councillors, the Library Committee, the Komgha Farmers' and Fruit-growers' Association, and the ladies who had arranged a picnic to Kei Bridge.

The members of the Board were invited to inspect the fruit farm of Messrs. Flanagan Bros, at Prospect, Komgha, many availing themselves of the offer.

FERTILISERS—HOW TO BUY AND VALUE THEM.

Lecture delivered before the Paarl Farmers Association,

By G. N. Blackshaw, Agricultural Chemist, Elsenberg Agricultural College.

My main object in this short paper is to bring to your notice a method by which those of you who are buyers of fertilisers are able to ascertain their cheapest source. I have chosen this subject firstly because the quantity of fertilisers used in the Colony is increasing year by year, and secondly because it will result in a direct saving from a financial point of view if you will put what I have to say into practice.

Before however proceeding with the valuation of fertilisers let me first of all briefly consider the arrangement of fertilisers into classes. The four constituents of the food of plants in which a soil is liable to be wanting are Nitrogen, Phosphoric acid, Potash and lastly Lime in the form of carbonate of lime.

A Fertiliser is valued according to the amount of one or more of these constituents it contains. Some fertilisers only contain one of these four constituents, others contain more than one, so we are able to arrange all substances made use of as fertilisers into the following classes.

Fertilisers supplying *Nitrogen* only	These most commonly used in the Colony are Nitrate of Soda, and Sulphate of Ammonia.

Fertilisers supplying *Phosphoric acid soluble in water* only	Superphosphate.
Fertilisers supplying *Potash* only.	Most common are Sulphate of Potash Muriate of Potash and Kainit.
Fertilisers supplying *Nitrogen* and *Phosphoric acid*	Most common are Guano, dissolved bones, and Bone meal.

Fertilisers supplying *Phosphoric acid* and *Lime.*—Basic Slag.

Lately we have the special manures, these compound manures generally supplying Nitrogen, Phosphoric acid and Potash are made by the manufacturer and sold under various names *e. g.* Vine Fertiliser, Potato Fertiliser, etc.

Farm yard manure is not included in the above classification· It supplies Nitrogen, Phosphoric acid and Potash, but it is of value not only on account of the plant food which it supplies, but also on account of its physical effect in improving the condition of the soil; the latter it is practically impossible to place any money value upon. The value however of the fertilisers mentioned in the above classification depends almost entirely on the amount of Plant Food they contain; they have little, if any, effect in improving the texture of the soil.

THE BUYING OF FERTILISERS.

Although a Fertilisers Act, compelling manure merchants to furnish a guaranteed analysis with any fertiliser sold, has not yet come into force, I have ascertained that the majority of them, if not all, are willing to supply a guarantee with all consignments of fertilisers to buyers asking for same, and I would strongly advise you when buying fertilisers to ask for the guaranteed analysis in respect to its fertilising ingredients and to refuse to buy if they are unwilling to supply such guarantee.

A Fertilisers Act is urgently required in this Colony; for not only will the merchant be compelled to supply the guarantee, but also the method of expressing such guarantee will be *systematised*; at the present time, as I have said, merchants are willing to supply the guarantee, but the methods of expressing it are in many cases very crude, with the result that in some cases it is impossible to ascertain the amounts of valuable ingredients present in the fertiliser. Until a Fertilisers Act comes into force and thereby the systematising of the guarantees given with fertilisers brought about, the merchant is apt to give the buyer a guarantee containing much that is unnecessary, consequently a guarantee very often serves to confuse rather than to enlighten the farmer.

I have therefore taken the liberty of giving you the information with regard to the various fertilisers which you should ask the merchant to supply to you, and *ask him to supply these details and nothing more or less*

GUARANTEES REQUIRED WITH THE UNDERMENTIONED FERTILISERS.

	Require to know	General Guarantees are
Nitrate of Soda	Purity and percentage of Nitrogen in it	95 per cent. pure containing 15·6 per cent. Nitrogen.
Sulphate of Ammonia	Percentage amount of Nitrogen in it	Contains as a rule at least 20 per cent. Nitrogen.
Superphosphate	Percentage amount of Phosphoric acid (P_2O_5) soluble in water	12 to 18 per cent. Phosphoric Acid (P_2O_5).
Bone meal and steamed bone meal	Percentage amount of Nitrogen and Percentage amount of Phosphoric Acid (P_2O_5). The Phosphoric Acid in bone meal and steamed meal will not dissolve in water hence they are not so quick acting as superphosphate.	Meal from raw bones— 3½ per cent Nitrogen 23 per cent. Phosphoric Acid (P_2O_5). Meal from steamed bones,— 2½ per cent. Nitrogen. About 29 per cent. Phosphoric Acid (P_2O_5).
Kainit	Percentage am'nt of pure Potash (K_2O)	Kainit 12 to 15 per cent Potash
Muriate of Potash	Do.	Muriate of Potash about 51 per cent. Potash.
Sulphate of Potash	Do.	Sulphate of Potash about 49 per cent. Potash.
Basic Slag	Fineness (*i.e.* percentage amount which passes through a sieve containing 10,000 meshes to the sq. in) and percentage amount of Phosphoric Acid (P O_5).	Fineness should be at least 80 per cent. Phosphoric Acid .— High Grade, 17 to 20 p. c. Medium Grade, 14 to 16 p c. Low Grade, 10 to 12 p. c.
Guano	Percentage amount of Nitrogen and Percentage amount of Phosphoric Acid (P_2O_5).	Iohaboe Guano contains 7 to 11 per cent. Nitrogen and 5 to 15 per cent. Phosphoric Acid (P_2O_5).
Dissolved bones	That it contain nothing but bones dissolved in Sulphoric Acid and Percentage amount of nitrogen Percentage amount of Phosphoric Acid (P_2O_5), soluble in water. Percentage amount of Phosphoric Acid (P_2O_5). insoluble in water.	Nitrogen 2½ to 3 per cent Phosphoric Acid (P_2O). soluble in water, 9 p. c. Phosphoric Acid (P_2O_5), insoluble water 4½ to 9 p. c.
Mixed Fertilisers (*e.g.* "Grain" Fertiliser)	Percentage amount of Nitrogen Percentage amount of Phosphoric Acid (P_2O_5), soluble in water. Percentage amount of Phosphoric Acid (P_2O_5), insoluble in water. Percentage amount of Potash (K_2O).	

METHOD OF ASCERTAINING THE COMPARATIVE VALUES OF FERTILISERS.

Manure merchants, as I have already mentioned, express the amounts of valuable constituents in fertilisers in various ways, and before one can ascertain the comparative values of two or more fertilisers he must just have the valuable ingredients of the fertilisers expressed in the same form. Here is given a "conversion" table by which to do this.

Amount of	Divided by	Gives Corresponding Amount of
Ammonia *or* "Nitrogen equal to Ammonia"	1·21	Nitrogen.
Sulphate of Ammonia	4·7	do.
Nitrate of Soda	6·07	do.
Tri-basic Phosphate of Lime, *or* Tri-Calcic Phosphate, *or* ' Soluble Phosphate (*i.e.*, Tri-Calcic Phosphate rendered soluble)	2·18	Phosphoric Acid (P_2O_5)
Tetra-Calcic Phosphate *or* Slag Phosphate	2·55	do.
Sulphate of Potash	1·85	Potash (K_2O).
Nitrate of Potash	1·58	do.

Examples:—

Superphosphate. The valuable fertilising ingredient of Super phosphate is Phosphoric acid (P_2O_5), soluble in water. The following quotations were this year supplied to Elsenburg for two samples of Superphosphate :—

(*a*) Superphosphate.—Guaranteed to contain 12 per cent. Phosphoric acid (P_2O_5), soluble in water at 85/- per ton.

(*b*) Superphosphate.—Guaranteed to contain 17 per cent. Phosphoric acid (P_2O_5), soluble in water at 100/- per ton.

Which is the cheaper fertiliser ?

(*a*) 100 lbs. of the fertiliser contains 12 lbs Phosphoric acid. Therefore 2,000 lbs., or 1 ton of the fertiliser, contain 12 x 20 lbs. Phosphoric Acid = 240 lbs.

$$\left.\begin{array}{l}\text{Price per lb. Phosphoric acid}\\ \text{soluble in water}\end{array}\right\} = \frac{85/-}{240} = 4\tfrac{1}{4}\text{d.}$$

(*b*) 100 lbs. of the fertiliser contain 17 lbs. Phosphoric acid. Therefore 1 ton of the fertiliser contains 340 lbs. Phosphoric acid.

$$\left.\begin{array}{l}\text{Price per lb. Phosphoric acid}\\ \text{soluble in water}\end{array}\right\} = \frac{100/-}{340} = 3\tfrac{1}{2}\text{d.}$$

Hence (*b*) is the cheaper. The one which seemed at first sight to be dearer is the cheaper.

71 lbs. of (*b*) contain as much Phosphoric acid as 100 lbs. of (*a*), or, in other words, 71 lbs. of (*b*) are equivalent to 100 lbs. of (*a*).

The railway charges would be the same on 1 ton of (*a*) as upon 1 ton of (*b*), but with (*a*) only 240 lbs. of the valuable plant food would be secured, whereas with (*b*) 340 lbs. are secured and that at ¾d. per lb. cheaper.

Suppose the Phosphoric acid in (*b*) cost the same as the Phosphoric acid in (*a*), that is 4¼d. per lb., what would 1 ton of (*b*) cost?

There are 340 lbs. of Phosphoric acid in 1 ton of (*b*)
340 lbs. at 4¼d. per lb. £6 0 0
The actual price charged for (*b*) was £5 0 0

Comparative Values of two samples of Basic Slag.

In the purchase of Basic Slag "fineness" is very important, and a guarantee of 80 per cent. "fineness" should be insisted upon.

Here are are two Cape Town quotations:—

(*a*) Basic Slag.—Guaranteed to contain 17 per cent. Phosphoric acid (P_2O_5) and 85 per cent. "fineness" at £3 5s. per ton.

(*b*) Basic Slag.—Guaranteed to contain 15 per cent. Phosphoric acid (P_2O_5) at £4 15s. per ton.

(*a*) 100 lbs. of the fertiliser contain 17 lbs. of Phosphoric acid. Therefore 2,000 (or one ton) contains 340 lbs. of Phosphoric acid.

$$\text{Price per lb. Phosphoric acid} = \frac{65/\text{-}}{340} = 2\tfrac{5}{17}\text{d.}$$

(*b*) Worked out in a similar way.

Price per lb. Phosphoric acid, $3\frac{4}{5}$ d.

Therefore (*a*) is much the cheaper.

Suppose the Phosphoric acid in (*a*) cost the same as in (*b*), that is $3\frac{4}{5}$d. per lb., what would one ton of (*a*) cost?

There are 340 lbs. of Phosphoric acid in one ton of (*a*).

340 lbs. at $3\frac{4}{5}$d. = £5 7s. 8d.

The actual price charged for (*a*) is £3 5s. per ton.

Comparison of Potash Manures.

The following are two quotations:—

(*a*) Sulphate of Potash, guaranteed 91 to 93 per cent. pure at £15 per ton.

(*b*) Muriate of Potash, guaranteed to contain 51 per cent. potash (K_2O) at £16 per ton.

The only valuable fertilising ingredient in each case is Potash.

We must first bring the guarantees to the same form. 100 lbs. "Sulphate of Potash" fertilizer contain 91 lbs. pure Sulphate of Potash. To find the factor whereby to find the amount of Potash in 91 lbs. Sulphate of Potash refer to "conversion" table. We see Sulphate of Potash divided by 18·5 gives the corresponding amount of Potash. Hence 91 lbs. Sulphate of Potash contain $\frac{91}{1{\cdot}85}$ lbs. of Potash = 49·1 lbs. of Potash.

We have thus :—

(*a*) Sulphate of Potash, guaranteed to contain 49·1 per cent. Potash (K_2O) at £15 per ton.

(*b*) Muriate of Potash, guaranteed to contain 51 per cent. (K_2O) at £16 per ton. Which is the cheaper?

(*a*) 100 lbs. Sulphate of Potash contain 49·1 lbs. Potash.
2,000 lbs. or 1 ton Sulphate of Potash contain 982 lbs. Potash.

$$\text{Price per lb. Potash} = \frac{£15}{982} = \text{between } 3\tfrac{1}{2}\text{d. and } 3\tfrac{3}{4}\text{d.}$$

(*b*) Worked in the same way.
Price per lb. Potash = between $3\frac{3}{4}$d. and 4d.

(*a*) is therefore a little cheaper.

Note.—Where the percentages are given, *e.g.*, Sulphate of Potash 91 to 93 per cent. pure, always take the lower one for the calculations as that is the only one for which the merchant is liable.)

Comparison of Values of two samples of Nitrate of Soda.

The valuable ingredient of Nitrate of Soda is Nitrogen.

(*a*) Nitrate of Soda, guaranteed to contain 15·6 per cent. nitrogen at £14 10s. per ton.

(*b*) Nitrate of Soda, guaranteed to contain 15 per cent. nitrogen at £14 per ton.

Which is the cheaper fertiliser.

By a similar method to that used in the previous examples.

The nitrogen in (*a*) works out at a shade over 11d. per lb. which is a fraction of a penny less than the cost of nitrogen per lb. in (*b*).

Special Fertilisers, e g., Vine Fertilisers, Grain Fertilisers, etc. When buying special fertilisers *ask not only for the guarantee but also for the sources of the fertilising ingredients* present in the compound; the nitrogen for example may be present in the fertiliser in the form of "ground horn" or "hoof parings," the nitrogen of which is of very little value compared with for instance the nitrogen in Nitrate of Soda.

Method of Ascertaining if a Reasonable Price is being charged for a Special Fertiliser.—A "Grain" Fertiliser is guaranteed and quoted as follows:—

Nitrogen ...	... 3·6 per cent.	Source of Nitrogen: Sulphate of Ammonia.
Phosphoric Acid (P_2O_5) soluble in water	12·5 per cent.	Source of Phosphoric Acid: Superphosphate.
Potash ...	... 1·5 per cent.	Source of Potash: Sulphate of Potash.

Quoted at £8 per ton."

We desire to find out if £8 per ton is a reasonable charge.

In one ton of the Grain Fertiliser there are

3·6 x 20 lbs. of Nitrogen = 72 lbs.
12·5 x 20 lbs. of Phosphoric Acid (P_2O_5) soluble in water . . ... = 250 lbs.
1·5 x 20 lbs. of Potash = 30 lbs.

From foregoing examples we have seen that we can buy

Nitrogen ... ... at 11d. per lb. (The Nitrogen in Sulphate of Ammonia is of about the same value as that in Nitrate of Soda.)
Phosphoric Acid (P_2O_5) soluble in water at 3½d. per lb.
Potash ... ... „ 3¾d. per lb.

Using these values:—

		£	s.	d.
Nitrogen...	.. 72 lbs. at 11d. per lb.	3	6	0
Phosphoric Acid (P_2O_5)	250 lbs. at 3½d. per lb.	3	12	11
Potash ...	.. 30 lbs. at 3¾d. per lb.	0	9	4½
		*£7	8	3½

In conclusion I cannot lay too much stress on the importance of buying your fertilisers on guaranteed analysis. Earlier in the paper the information required in the guarantee for some of the common fertilisers has been given; that guarantee you can have checked occasionally by the Government Analyst for a nominal fee.

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*It is reasonable to add 5 to 10 per cent, according to the excellence of their manufacture, for the labour entailed in making up the compound, so that the price charged £8 per ton) for the Grain Fertiliser is reasonable.

INTER-COLONIAL AGRICULTURAL UNION.

First Annual Congress at Maritzburg.

The first meeting of the Inter-Colonial Agricultural Union of South Africa was opened in the Supper-room of the Town Hall, Pietermaritzburg, on Wednesday morning, October 25th, the list of delegates present being as follows:—

Cape Colony: D. Hutcheon, Acting Director of Agriculture, Cape Colony, and F. D. MacDermott (representing the Cape Department of Agriculture); Port Elizabeth, M. M. Loubser, R. F. Hurndall, C. A. Mackay, G. S. Whitehead, and D. M. Brown; Hex River, P. R. Malleson; Deelfontein, F. C. Bayly; Worcester, J. S. Du Toit, A. P. Burger, G. Hamman, J. S. Kloppers, and A. P. Kloppers.

Transvaal: Standerton, A. H. Malan; Wakkerstroom, A. G. Robertson; Ermelo, T. Smuts; Pretoria, Theo. Hitcheson and William Macdonald.

Orange River Colony: John A. Van Rooyen.

Natal: T. J. Nel and C. H. Mitchell, Imbiyana; Geo. D. Alexander, Nel's Rust; C. E. Hancock, Ixopo; Claude Fuller (Government Entomologist), Maritzburg; and A. K. Murray, Nottingham Road.

Mr. G. D. Alexander (President of the Natal Agricultural Union) was unanimously elected President for the forthcoming year.

The delegates then adjourned to the Council Chamber to receive an address of welcome by the Mayor, and later a welcome from the Governor.

Municipal Welcome.

The delegates were received in the Council Chamber by the Mayor (Mr. A. W. Kershaw) and Councillors in robes, the Mayor wearing his chain of office. The Councillors present were:—The Deputy Mayor (Councillor W. J. O'Brien), and Councillors Sowersby, J. Mason, M.L.A., B. Ireland, G. Laffan, L. Line, F. Hathorn, R. Mason, B. S. Kelly, W. Harris, Wesley Francis, P. J. Taylor, and Hugh Parker.

The Mayor presented to the President of the Congress the following resolution, whhich had been passed at an earlier meeting of the Council:—"That the Town Council of the City and Borough of Pietermaritzburg, in Council assembled, desires to extend a most hearty and cordial welcome to the President and members of the

Inter-Colonial Agricultural Union of South Africa, on the opening of its first session. The Council considers it an honour and a compliment to the Colony of Natal that the first meeting should be held in the capital of the colony, and trusts that the establishment of such a Union and its deliberations on this occasion may prove to be of the greatest benefit in the advancement of agriculture throughout South Africa, and further expresses the hope that the visit of the members of the Union may be both pleasant and instructive."

The Mayor presented the resolution to the President of the Congress (Mr. G. D. Alexander), who suitably replied.

OPENING SPEECH OF H.E. THE GOVERNOR.

H. E., the Governor of Natal, Sir H. McCallum, officially opened the proceedings.

He said (reports the *Times* of Natal) that he was pleased that it had fallen to his lot to open the first meeting of the Congress. They were not a meteor, they were not a flash in the pan, they were a fixed star, and that a very bright one, in the firmament of South Africa. To them South Africa was not a mere resting house, it was an abiding city. It was a home, and in addressing them he was therefore addressing representatives whom, he might say, were "the boys of the old brigade." This Congress, he firmly believed, ushered in a new era in the history of South Africa. They were assembled to discuss in Council and Congress things of extreme importance to South Africa in general, and to their individual selves in particular. He much wondered whether those who were really responsible for this movement really thought at the time that they conceived it, how much and how greatly it would contribute to the welfare of South Africa. Agriculture in its largest sense was a matter in which all classes and all sections of the community could meet on a common platform. It was a subject of vital interest and of vital importance,, not only to one, but to all of the States of South Africa, and it was one in which knowledge which was obtained in one State could be of advantage to the whole. (Applause). Gold and diamonds were ephemeral. Sooner or later they would peter out, but the land would be there, and they and their descendants would be upon the land. It was therefore important that before those two commodities did peter out that they should take such action and work so well together that South Africa would bo distinguished as a grand agricultural portion of His Majesty's possessions in the same way in which public attention was mainly directed to the gold and the diamonds. Lord Selborne a few days ago, under that very roof, referred to the necessity of not forcing

The Spirit of Federation.

Lord Selborne was perfectly right. That must come gradually, and from the inside. Any attempt which may be made to bring it about either on sentimental or Imperialistic grounds was foredoomed to failure. Either it would be only precipitating the movement upon a community or communities, which were now anxiously doing what they could in taking preparatory steps for removing difficulties and minimising danger, or else it would actually frighten such communities and possibly bring about delay in carrying out a step which he believed appealed to everyone if it could only be carried out at the earliest safe moment. Federation must come from the inside, and it would be brought about by deep thinking on the part of those interested, and who would find how much it contributed to their mutual advantage and mutual gain to bring about such union; in other words, how much more advantageous it was to be a bundle rather than a single state. Sentiment itself in a small way may come into play, but it would only be the atmosphere, more or less clear, which surrounded a solid globe of facts. He thought that this Inter-Colonial Congress was in itself a preparatory step such as that to which he had referred. (Applause.) And not only was it a preparatory step, but he thought that, as the first step of any child, they might call it a great stride, and that meant that the child would soon grow up to be a very big, stalwart man. (Applause) Inter-colonial development must be the watchword of South Africa, and it was to promote such development that he could see that this Congress would be of the very greatest possible advantage, because it would enable agriculturists to exchange views, ideas, knowledge and experience, as agriculturists whether they live north or south of the Orange River, north or south of the Drakensberg, east or west of the Umzimkulu and Pongola. What did that all mean? It meant, first, that they must learn how

. To Feed Themselves

and that they must for as short a time as possible still endure the reproach of being dependent upon over seas for more or less what was known in French as "munition de bourse." It meant more than that. It meant that they must aim to do all they possibly could to export and produce agricultural commodities generally, in the way as the great possessions of Australia, of Canada, and New Zealand now do, because export means money coming in. Imports mean money going out, and what they wanted was money to come in. He was glad to see that the Cape Colony which he might call the premier colony, who ran while the other States were little toddlers—had taken a good step forward since the end of the war in exporting fruits. (Applause). It was an excellent step. It was a step which could be well extended, and the operations of which need not by any means be confined to the Cape Colony. In the same way the Orange Colony could call itself more or less a simple agricultural colony, because there questions of internal administration were not taken up so much as in the other colonies of South Africa with matters of minerals. The Orange Colony had a grand future before it, and would, he ventured to say, in the not far distant future, be one of the principal centres of South Africa in exporting produce. How was that to be brought about?

That was a matter on which he felt somewhat diffident in speaking. He was not a farmer, and the little he had learned had been due to the kindness of those with whom he had come in contact during his administration in the colony, who had been good enough to discuss matters freely with him in every portion of the colony, and with whom he had felt proud to associate himself in trying to learn to the best of his abilities one of the most interesting problems of South Africa. It was for them as a Congress to consider and devise suitable means by which this desideratum could be carried into effect. However, they would allow him to put his diffidence on one side for a moment and make a few remarks, for what they were worth, for their consideration. One point which had struck him extremely in South Africa in reading the history of its agriculture alongside the histories of Australia and Canada, was that they had in their midst one most valuable asset which should give them an immense advantage over those countries. He referred to

NATIVE LABOUR.

That native labour should no longer be allowed to drift. (Hear hear.) It should be directed. That native labour should be trained industrially, and no branch of industry could it be better trained in than in agriculture. If that were done, he said at once that they had an enormous advantage over the other big colonies he had mentioned and who were obliged to pay as much for their labour as one shilling an hour. Then they must, as far as possible, reduce the cost of living. That was not done by piling on protection. Protection was good enough in its proper place, but it could be forced to extremes, and if they were not to have a high cost of living, protection should not be put on except where it was required for revenue purposes. Another thing was co-operation among themselves. Co-operation at the present moment was in its infancy in South Africa. Now they, as an Agricultural Union, were a co-operative society in themselves in its very highest form. Therefore, he would appeal to them, if they had time, to consider that

SUBJECT OF CO-OPERATION,

given that the principle was sound, endeavour, with the great abilities which they would bring to bear, to devise suitable means for carrying out that co-operation. He felt sure they all recognised that isolation did not pay, whether it was with nations, or communities, or farmers. Isolation too often meant ignorance and inferiority. There was one point which was at the bottom of some of the failures of some of the efforts which had been made, and that was that farmers did not regard each other with sufficient confidence. (Applause.) There seemed to be abroad a spirit of suspicion and distrust, which must be dispelled if co-operation was to be carried into effect. Let every farmer have before him a big code of honour, and if any farmer broke that code of honour, let him be ostracised by his fellows. Let honour be their watchword, let honour be their banner. In connection with that matter of co-operation, Mr. Nicholson (the Secretary of the Congress) had been good enough to send him a paper, which he would read before the Congress. In that paper Mr. Nicholson referred to co-operation, and there was a statement in his report that "it is gratifying to find that the Cape and Natal Governments had arranged for the granting of financial assistance to such co-operative schemes." He could not speak for the Cape, he did not know what had been done there, but he thought Mr. Clayton (the Minister for Agriculture) would confirm him when he said that Natal had not given any assistanee in that direction. All that the Natal Government had done was to start a system of cash on delivery so as to put the producer in close touch with the consumer. It also did what it could to encourage co-operative factories, creameries, and establishments of that sort. It had actually built a cold storage in Maritzburg for the farmers, which he was grieved to see they had never used at all (Laughter.) In fact, he took the privilege of telling a former Prime Minister at the time that he believed a mistake was being made because it was a thing which, if required, the farmers might reasonably be expected to co-operate and do for themselves, because it did not do in these days to be doing for others what they ought to do, as it tended to diminish that

SPIRIT OF SELF-RELIANCE

which they ought to have. There was one little bit of advice he would like to give to the farmers. That was that in national matters they should think Imperially, and in local matters he would ask them not to think simply from the platform of the parish. He asked them to think from the South African point of view. Another matter was the encouragement of scientific farming. Australia would never be sending large exports from its coasts, neither would Canada, if old-fashioned farming had been kept up. They had sprung to the situation and made enormous efforts to start and work their farms and their industries by the most scientific methods available. He was glad to say that a movement in that direction was taking place at the Cape. In Natal he was glad to see that a commencement had been made, although there was much leeway yet to pick up. There was one more point, and an important point. They would remember, no doubt, that when Napoleon called the British nation an army of shopkeepers, half the people were agriculturists and on the land. Since then trade and manufactures became England's main thought. Populations crowded into the towns, and the land was given up. What had been the result? As long as England had command practically of those manufactures, everything went well, but when foreign competition came in, congestion took place in the towns, and they found a very large number of unemployed, so that the modern cry was "get back to the land." They in South Africa

ALSO WANT POPULATION

on the land. He had not hesitated at various agricultural conferences to urge that question of population. It had been taken by some to mean that the increase should be in the population in the towns. That was very far from his thought, and he was sure it was very far from their thoughts. It was putting the cart before the horse. They wanted to get a population on the land, and they could then start all the different things in connection with the towns when they would have a white population behind them, larger than the present white population in South Africa. They need not be told that the white population in the whole of South Africa did not amount to the population of Staffordshire. That matter of small settlers had engaged attention for some time. He saw no reason why small settlers should not be the success in South Africa that they had been in other parts of the world. He did not mean that those settlers should be by themselves. They should start as small self-contained communities working at mixed farming on co-operative principles, and given those lines, he believed that the much-desired question of population on the land might yet be effected. He was encouraged on reading the report recently issued by the Chairman of the Land Board who had had the opportunity of visiting Australia and New Zealand. After his experiences in those countries he had said that he was of the opinion that any industrious farmer, willing to work as farmers are accustomed to work in England, and possessed of capital of £500, would have a better chance of success in Natal than in Australia or New Zealand. The subject for which they were assembled was a comprehensive one, and one which he felt he could talk upon for hours. He could not emphasise too much the necessity of encouraging union, trust, and co-operation in such subjects as irrigation, particularly on the small scale, experimental farms, agricultural colleges, magazines, and journals, the treatment of pests, especially East Coast fever, which required special treatment in itself—all these subjects were subjects for their earnest consideration, to see whether South Africa could not be united in working upon satisfactory lines, and even effect economy in its improvements by joint co-operation. He earnestly appealed to them upon one point, and that was to avoid politics in their deliberations as much as possible. (Applause and hear, hear.) By this he did not mean they were to stultify any legitimate subject connected with agriculture upon which legislation might be required, but he had seen much harm done at past Conferences of the kind by the interminable discussion of matters purely political. Politics were required for another place, and even there they sometimes got a surfeit of them, and he asked them to remember the adage, "Every cobbler should stick to his last." He would like to congratulate the heads of the Agricultural Departments of the different colonies upon the excellent and yeoman service they had done, and if they would allow him to take up the parochial attitude which he had deprecated, he would like to mention upon this, the first opportunity he had had at such a Conference, how much he, as Governor of the colony, appreciated the efforts which were being made by the Minister of Agriculture, Mr. Clayton. Mr. Clayton had done excellently well, and he bid him proceed in that course. He hoped that every blessing would accompany their deliberations, and that the decisions and findings they might come to would bear good fruit for the betterment and advantage of South Africa. (Loud applause.)

THE MINISTER OF AGRICULTURE.

The Minister of Agriculture, the Hon. Mr. W. F. Clayton, spoke in welcome of the delegates to the Congress from the sister colonies. He said that his Excellency had not left much to be said. The Congress that day saw a great stride forward in agriculture in South Africa, and he believed that the effects of it would be so far-reaching that at the moment it would be impossible to estimate the degree of influence. He congratulated them upon the fact that they had chosen the word "Union" as their corporate name, because it sounded as if the body had really come to stay, and to stay for good —the good of the agricultural community. "Union makes strength" was an old proverb. They had found it gradually becoming patent to those engaged in agriculture and other pursuits in South Africa, but it was a fact which was very slow in coming home to the hearts and minds of those who were situated in such isolated districts as those which abounded in the huge sub-continent. He hoped that as a Union they would be greatly educative of public opinion in South Africa.

Mr. M. M. Loubser replied on behalf of Cape Colony, Mr. A. H. Malan for the Transvaal, and Mr. J. C. Van Rooyen for the O.R C After being taken round the town on the electric cars, the delegates lunched with the Mayor at the Victoria Club.

AFTERNOON SITTING.

The business of the Congress really began in the afternoon. In addition to the delegates mentioned above, the following officials of the Natal Government were present:—The Minister of Agriculture (Hon. W. F. Clayton), Secretary to the Minister of Agriculture (Mr. Mullins), Dairy Expert (Mr. Challis), Government Bacteriologist (Mr. Watkins Pitchford), and others.

The first business was consideration of the minutes of meeting held at Pretoria in 1904. It was at that meeting that the Inter-Colonial Agricultural Union was formed. The minutes were adopted.

The secretary's report was then read at length and adopted on the motion of Dr. Hutcheon, seconded by Mr. Malan.

SECRETARY'S REPORT.

The full text of the report is as follows:—

When this Inter-Colonial Union was formed in July of last year, it was hoped that its sphere of activity would embrace the whole of British South Africa, and that agriculturists generally would readily respond to the call which was to be made upon them for the exercise of individual effort in the betterment of the condition of the important industry with which they are connected. It is with great regret that it is found necessary to report that, for various reasons, this hope has not been fully realised. The general depression which has characterised the period which has elapsed since the holding of our first meeting has been of such a serious nature as to very largely account for the fact that so little apparent progress has been made in furthering the objects of the Union. Farmers, generally speaking, have found but little leisure time to devote to the propagation of ideas which are to a large extent new to them, and have been compelled to apply their energies to the more prosaic task of earning a livelihood. The result of this has been that funds have not been forthcoming for the prosecution of the work which was marked out for this organisation at the commencement of its course. So far only two of the South African colonies have affiliated with the Union, and gone the length of paying the yearly subscriptions provided for in the regulations. We are therefore, to-day, in the position of practically beginning our work anew. As those delegates who were present in Pretoria will remember, it was there decided that the various Governments should be approached for the purpose of endeavouring to secure a special grant from each Colony, based upon the supposed interest in agricultural matters, likely to be dealt with by this Union. From the Cape a sum of £200 was to be asked, from the Transvaal £200, from Natal £100, from the Orange River Colony £75, and from Rhodesia £25. It was considered that the total amount thus specified, if obtained, together with a subscription from the Agricultural Unions of each of the five Colonies of 25 guineas, would have enabled the Union to have entered upon a successful career. His Excellency, Lord Milner, the High Commissioner, was appealed to with a view to his personal influence being used with the various Governments for the securing of the amounts previously mentioned, but, with the exception of the Transvaal, no other Colony expressed its willingness to contribute to the necessary funds.

In spite of these initial drawbacks, it is encouraging to be in a position to state that there is not a single British Colony in South Africa which has not, through some representative agricultural body, signified its approval of the establishment of such an Inter-Colonial Union, and its desire to be represented at this Conference, for the purpose of placing the institution upon a sound and useful working basis. It cannot be said that the previous meeting has been unfruitful of results. The question of the establishment of a South African Stud Book Association, which was then discussed, is fast assuming practical shape, and books for the registration of pedigree stock have been opened, with the financial support of the respective Governments concerned, in at least three of our Colonies. We have good reason for believing that the day is not far distant when all the Colonies will co-operate in this important undertaking.

At a meeting recently held in Bloemfontein, steps were taken for the formation of a Central Board, whose headquarters are situated in the Cape Colony, and of which Central Board Mr. C. G. Lee has been appointed secretary. As a result of his well-known enthusiasm, the movement is rapidly spreading through the Cape Colony. In the Transvaal and the O.R.C., Registration Boards have been appointed, with inspectors for the various classes of stock, and it is anticipated that the work of registration will soon be in full swing. His Excellency the Earl of Selborne, His Majesty's High Commissioner, has graciously consented to accept the position of patron of the Association, and is using his influence in furthering its aims.

The suggestions which were made by members of the Pretoria Conference in respect of the eradication of Rhodesian redwater in the Transvaal were regarded as being of too drastic a nature, and were not adopted in their entirety, but it is gratifying to be able to state that, owing to the enforcement of quarantine regulations, the fencing of infected areas, and the generous assistance given to the farmers by the Transvaal Government, in respect thereof, the disease is rapidly dying out, and has been largely prevented thereby from spreading into neighbouring colonies.

The question of a uniformly stringent Scab Law for the whole of South Africa has been discussed in each Colony, and the general concensus of opinion among the more intelligent farmers is that such steps as are deemed necessary should be taken at once for the furtherance of this necessary legislation. It is interesting to note that in the O.R.C. and in the Transvaal this matter has already been dealt with in a manner which it is hoped will prove satisfactory to all concerned. The subject will come before this Conference for discussion, and the decisions arrived at will be of immense importance in the securing of desirable and uniform action throughout British South Africa.

The subject of co-operation among farmers for the disposal of their produce upon more favourable terms has been considerably advanced during the past year, and it is gratifying to find that the Cape and Natal Governments have arranged for the granting of financial assistance to such co-operative schemes. In the Cape Colony an expert is at the present time touring the country in order to instruct the farmers in the leading principles of successful co-operation. It is to be hoped that other colonies will realise the wisdom of thus assisting their agricultural population, by placing the latest information at their disposal. In addition to the then existing co-operative stock and stud fairs, the Bedford (Cape Colony) farmers have also taken a step in advance by organising a monthly sale of stud rams, and this has proved a great convenience to buyers and a benefit to the breeders.

The sheep farmers of the Orange River Colony have formed a co-operative union for the exporting of their wool to the best available markets, and have succeeded in entering into an arrangement, which they consider most satisfactory, with a reputable European firm, who will act as their agents, and advance money on the wool consigned to their care before it leaves South African ports. The Transvaal is following suit, not only in this respect of wool, but also in reference to its tobacco crop. A creamery has also been established in the Potchefstroom district, with every prospect of a successful future.

As the result of representations which have been made to the railway administrations, reductions have been secured in the freight charges upon fencing material, agricultural implements, and artificial manures, much to the advantage of the inland colonies. Relief has also been granted in respect of cartage charges to and from stations in favour of farmers who choose to perform their own transport. There still, however, remains much to desire in respect of the relationship between our railways and our agriculturists.

Signs are not wanting that opportunities such as are afforded by the present Conference are resulting in the closer union of those whose interests in the prosperity of agriculture are identical, in spite of the artificial local boundaries which separate them one from the other.

It is with the greatest regret that we have to record the death of the Hon. Arthur Douglass, one of the delegates appointed by the Cape Colony to attend this Conference. His presence will be greatly missed by us, and his long and varied agricultural experience would have rendered his counsel and advice most valuable to this gathering.

Our thanks are due to Lord Selborne for his ready acceptance of the position of Patron of the Inter-Colonial Union, and for the active interest which he has already shewn in our work by requesting the various South African Governments to grant us their financia support. His Lordship's practical knowledge of agricultural problems and his desire to fully understand the conditions peculiar to the industry in South Africa, augur well for the future, and lead us to hope that our just claims will, at all times, be carefully and sympathetically considered.

It is greatly to be desired that the deliberations of this Conference should tend to arouse the interest of all South African agriculturists in the work of the Union, and should serve to hasten the day when our mutual interdependence will result in that actual co-operation which is so much needed in order to place the industry which we represent in that important position which it has every right to occupy.

The thanks of the delegates from other colonies are due to the Natal Agricultural Union for the pains which have been taken to provide for the holding of this Conference, and for the programme which has been arranged for the entertainment and edification of the visiting delegates.

Our thanks are also due to the various railway administrations for the ready manner in which they have rendered assistance in the matter of reduced fares over their respective lines, and we express the hope that one of the results of this Conference will be to increase the amount of traffic in agricultural produce which will pass over their lines, thus bringing within measurable distance the day when our agricultural supplies will equal, or even exceed, the local demand.

THE OFFICIALS.

In the election of officials the following were placed on the list as Vice-presidents :—Mr. A. H. Malan (Transvaal) ; Mr. M. Loubser (Cape Colony) ; Mr. H. A. Brown (O.R.C.) ; and Mr. Mitchell (Natal). The following advisory members were also elected :—Mr. Hutcheon (Acting Director of Agriculture for Cape Colony) ; Mr. Palmer (Director of Agriculture, O.R.C.) ; Mr. H. Watkins-Pitchford (Bacteriologist, Natal) ; and Mr. F. Smith (Director of Agriculture, Transvaal).

CONTAGIOUS DISEASES OF STOCK.

Mr. Hutcheon moved : "This Conference deems it advisable that combined action should be taken by the various Governments of South Africa with regard to infectious and contagious diseases among stock."

It was pointed out that motions of the kind were continually being passed by bodies subsidiary to the Union, and without effect.

Mr. Hutcheon said a special committee was required for such a matter.

Mr. Nel, said that it was for the Governments to go into the details of prospective legislation.

After further discussion the resolution was carried unanimously.

UNIFORM INTER-COLONIAL SCAB LAWS.

Mr. Hancock (Natal), moved that : "This Congress urges the necessity for a uniform Inter-Colonial Scab Act, and that copies of this resolution be sent to the various Governments." He pointed out that sheep-farming, judging from the exports, was next in importance to gold itself, and urged that a determined effect should be made to stamp the disease out. Sheep-breeding was in its infancy, and if expanded would in the first place do away with the problem which confronted them in the way of imported mutton. The disease had been throttling the industry for years, and a determined effort should be made to do away with it.

Mr. Van Rooyen, of the O.R.C., in seconding the motion, spoke of the extensive efforts which were being made in the O.R.C., in the direction of curing scab. When sheep came to Natal they were neglected. He advocated a South African law to insist upon sheep being dipped twice a year, or that some such provision should be made. There was another difficulty of a departmental nature. The other colonies would not accept an O.R.C. certificate of dipping and *vice-versa.*

Mr. A. H. Malan (Transvaal), moved as an amendment that the following words should be added to the motion : "And that in case the Governments all agree to this motion, that it be carried out in consultation with the executive of this Union." He contended that by this means the different States would have the protection they desired.

Mr. Robertson seconded the amendment, and said that it was essential that the co-operation of the farmers should be obtained.

Mr. Hutcheon was pessimistic of getting the general co-operation of the farmers in one general law. The circumstances in different States were different. (Applause).

Mr. Power (Natal), Government Veterinary Surgeon, said that there was less scab in Natal than elsewhere in South Africa. Regarding the Orange River Colony, a special provision had been made regarding winter grazing in Natal. The O.R.C. sheep did not need to be dipped until after the grazing.

Mr. T. Smuts, of the Transvaal, was afraid of a Scab Law which would harm the farmers. He advocated the idea that each colony should be allowed to frame its own provisions to deal with its own peculiar circumstances. He went into detail, complaining of the manner in which scab had come to the Transvaal from the Cape Colony. Later he pointed out that sheep could pick up scab by travelling along a road which beforetime had been travelled by infected animals.

Mr. Murray, of Natal, said that the complaints of the delegates against each other's colonies was the best argument for a general scab law. He did not mean that the law should specify the details of the prevention of scab, such as a general period of dipping.

The Hon. R. T. Hurndall, Cape Colony, looked upon the motion as the most important on the agenda paper. He could not agree with Mr. Hutcheon that a general Act was impossible with local difference.

Mr. Hutcheon again contended it was no use giving vent to a pious wish that there should be a uniform law without suggesting to the Governments the lines upon which they wished the law to run.

It was moved, as an amendment, that the following motion should be substituted :—"This Conference deems it desirable that a uniformly stringent Scab Law be enforced in each of the British colonies of South Africa."

The Cape Colony and Transvaal voted solid for the last amendment, and Mr. Murray, of Natal, voted for the amendment. It was consequently carried by eleven votes to nine. Subsequently on the suggestion of Mr. Mitchell, of Natal, it was decided to make it an unanimous vote.

BRANDING OF STOCK.

Mr. Malan moved :—That this Conference affirms the principle of an Inter-Colonial Branding Act."

The mover, in reply to a question, said it was not proposed to make the branding compulsory.

Mr. Murray pointed out that no Act was necessary to allow a man to brand his cattle. After discussion an amendment was adopted that the principle of an Inter-Colonial Stock Branding Act, be affirmed. Congress then adjourned until 8 p.m.

EVENING SITTING.

SOUTH AFRICAN LABORATORY FOR STOCK DISEASE RESEARCH.

On resuming, the following motion was taken up:—"That this Conference considers it desirable that steps should be taken to establish a Central South African Laboratory, for scientific research, and for the investigation of diseases among live stock, in addition to the existing local laboratories."

Dr. Watkins-Pitchford in opening the debate said:—In reviewing the probable advantages to be derived from the adoption of a scheme of this nature, it seems to me that one great point to be urged in its favour is the fact that the institution in question would be designed from the first for one specific purpose, and that its sphere of work would be confined to the investigation and inquiry into the animal diseases of South Africa. This paramount and sole object should be clearly defined from the first, and always be borne in mind. The inevitable and premature demand on the part of the public for "results" as a return for the expenditure involved, will—unless such main object be clearly laid down—tend to force the hand of the Director in self-defence to develop the more practical and less speculative side of the institution, in the hope that by opening a credit side to his laboratory books and showing a revenue from the sale of vaccines, sera, etc., he will in some measure lighten the weight of hostile criticism. Such a concession—the attempt to serve the goddess of science and mammon of "practical" returns, can only be made by the sacrifice of the real objects of the proposed institution. This point, gentlemen, I would very seriously commend to your consideration in laying down the sphere and scope of such an institution. I do not make this suggestion without past experience to guide me. My own laboratory was planned and built, the money being voted expressly for the purpose of research work. An incredibly short space of time shewed me that the institution would not be likely to survive even long enough to get into efficient working order unless a prompt alteration of its aims and objects resulted in the production of some so-called "practical" results. I do not want to labour this point, but I feel certain that the success of the project now before you will depend upon its consideration. If you will permit me, I will lay before you what I deem to be the essentials of a scheme of this nature (a suitably fitted laboratory, appliances and premises being of course, understood). First, an ample endowment must be forthcoming. I use the word "endowment" to mean the provision of adequate resources assured for a stated length of time, and in contradistinction to the amount provided in the annual Supply Bills of the co-operating colonies, and, as such, subject to premature reduction (or even deletion) during the consideration of the yearly Estimates. Five years I consider a minimum period for such provision (I would personally advise ten years), as no results can be looked for until the new machinery of *personnel* and material is smoothly working. The problems to be faced will be difficult ones, which will necessitate excursions far afield into the unknown regions of speculative medicine and many discouragements and much expenditure of time will assuredly be encountered. Failing this provision, there will arise, in consequence, insecurity of tenure for the workers concerned, and uncertainty of supplies, which will attend the annual voting of funds for the carrying on of the institution, and this must inevitably lead to the publication of the hasty and immature scientific results so familiar to South Africans in the past, Security of tenure (in a broad sense) will build the institution upon a foundation which will not shift from year to year or be liable to be overset by the caprice or prejudice of the parties of the hour. An agreement on the part of the contracting States to assure annually a certain sum (in the shape of a grant in aid or subsidy) for a given time towards the upkeep of the institution would ensure a satisfactory degree of permanency, and enable the director to avoid both measures of popular expediency and "results" which are not able to stand the test of practical trial. After adequate provision for stability as well as of ways and means, the next point of importance is the question of form of management and the *personnel* of such an establishment. My opinion is that the fullest possible control and freedom of initiative should be vested in the director. To place the control of a scientific institution of this nature in the hands of a board of management composed of men not understanding the nature of the work to be attempted will result in dividing the responsibility for efficiency and results, besides opening the way to misunderstandings and friction in working. The aim should be, I consider, to place the institution beyond the reach of any preferential attitudes or influences from any particular supporters or detractors, and with this end in view it might be worth considering whether the control of the institution would not be better in the hands of the Governors and Administrators of the various States, as representing the various needs of the colonies concerned, the whole scheme being under the patronage of his Excellency the High Commissioner, to whom the annual report might be furnished. On such a point, however, gentlemen, it is not within my province to offer any suggestion. I merely call to notice the advisability of securing to the scientists concerned the ability to work, *equo animo,*with a mind undisturbed by any pressure of a personal or political nature. In this way only can you hope for first class work. Place the fortunes of the institution in the hands of an able man who can be trusted to do his utmost, give him a free hand in the choice of a staff (remembering that a man is marred or made by his subordinates), and then leave him for a reasonable period to work out his own salvation. These gentlemen are a few of the points which seem to me essential to the success of a Central Investigation Laboratory. With the difficulties of the scheme I have not attempted to deal. The main consideration in these depressed times will, I believe, be the cost of the project. The building and equipment of a suitable laboratory will cost probably from £7,000 to £10,000, and the working expenses per annum are likely to be about the same figure viz., £10,000 that is if an adequate staff is to be secured and work is to be undertaken on a large scale. This will mean an annual grant-in-aid of say, £2,000 from each of the five South African States, supposing each contributed equally. I do not think the scheme could be adequately carried out for much less, although my figures are hasty computations. One of the chief difficulties to be overcome at first would be found in the existing institutions which have, in the past, endeavoured, not altogether unsuccessfully, to carry out work of this nature. Such laboratories must, I think, still be maintained for the routine work which is the main reason for their existence; analyses, production of vaccines, diagnoses, and medico-legal requirements must be met locally, and where such work is done the arrangements and facilities, and to a certain extent the *personnel*, required for research work will be found. To dispense with such institutions is not possible, while to go beyond them to provide special provision for independent research will be to a certain extent to overlap the sphere of action of such laboratories, causing the unnecessary expenditure which overlapping always involves; and unnecessary expenditure is a consideration which I cannot but feel at the present time must have full weight with South African Governments. The question of emulation between various scientific workers in different parts is a factor which should not, I think, be lost sight of, but such spirit of emulation is only possible where the facilities for research work in different colonies are equal, a condition of things by no means obtaining at present. The advantages of local research can with justice also be urged against the tendency to centralisation. Local needs will always be liable to arise and demand skilled inquiry, and again local influences and conditions cannot be ignored in the investigation even of diseases which are common to the whole sub-continent (an example of this being the breaking down of the immunity acquired in one locality when an animal is removed to another, as in horse-sickness, malaria, etc.) This being the case, local inquiry will always have its value when measures of protection are being devised, owing to conditions of immunity being often only relative. In conclusion, gentlemen, an impartial survey has left me still endeavouring to balance the advantages of the scheme against its disadvantages. If fuller and more adequate facilities for research could be accorded to some of the institutions in our various colonies, and a broader and less critical attitude adopted towards them generally, I should be inclined to consider the individual system the better one. If this is impossible, the central scheme by its adequacy and independence—as well as by the stability which ought to be assured to it—will probably be the shorter route of arriving at the desired end. I do not, however, think that the greater economy of working will be able to be claimed for the centralising scheme. If I am able to suggest or advise further in a scheme of so much importance to the advance of scientific research in South Africa, I shall esteem myself happy in being able to do so. (Applause).

Mr. Hutcheon spoke in support of the resolution. He did not think it would be possible to give the Director of the institution such a free hand as Dr. Pitchford suggested, as it would be difficult in this country to get the colonies to agree to grant a vote sufficient for the purpose if they had no control. He thought the control of the institution could be safely placed in the hands of a board of directors, consisting of scientific men, as well as men of an administrative character. The committee of control could select or indicate to the Director the work that he should undertake, and see that he devoted his attention to it. He was convinced that the establishment of a central laboratory would prove more economical and much more efficient than the various efforts which were being put forward in the respective colonies. (Applause)

The President (Mr. G. D. Alexander) spoke in support of the resolution. Whenever any disease afflicted South Africa they sent to Europe for a scientist and paid him a large sum of money when they had men in the country competent to do the work. They had been let down very badly once or twice over the introduction of over-sea scientists. If a central laboratory were established, the experiments could be conducted on a larger scale, and the chances of success would therefore be greater. He believed in the centralisation of the work of the investigation of diseases. He saw no reason why the present laboratories should be done away with.

The resolution was carried unanimously.

DESTRUCTION OF LOCUSTS.

Mr. Mitchell proposed: "That this Conference considers it necessary that united action should be taken by the South African colonies in respect to the destruction of locusts." It might seem, he said, that tackling locusts was an impossibility, but they had been similarly pessimistic over the question of lungsickness and other diseases and pests which had been overcome. He could not submit to the word "impossible" in regard to this matter. Natal had done a good deal in the direction of destroying locusts, but they could do little, unless there was co-operation with the neighbouring colonies. He was convinced that years of work would put the locusts out of the country.

Mr. Claude Fuller (Natal Government Entomologist) in an interesting speech, in which he did not go into technical detail, explained Natal's crusade against the locust. He said that Natal was in a favourable position as regarded the locust. They came into the colony regularly every year about September and laid their eggs in December. Those eggs hatched in thirty days, and it took the young thirty days to come to maturity. The great damage done by locusts in Natal was done when they were in the "hopper" stage. Mr. Wilkinson had introduced the arsenical treatment, and the sugar planters had used it first with splendid effect, and now Natal had adopted the system generally. It paid the colony and the farmers a hundredfold to take the trouble and spend the money.

He strongly urged upon the delegates of other colonies the necessity for destroying locusts in the "hopper" stage.

The Minister of Agriculture spoke of the success of the treatment in the colony. He had taken steps with the other colonies with regard to the checking of the locust pest in South Africa, and the Government of Natal had met with a certain amount of success in its negotiations. A considerable amount of work had been done in the past year in the Transvaal, and the Orange River Colony had passed an Ordinance which ran upon the lines of the measure in force in Natal. During the past week they had received an application from the authorities of Basutoland asking Natal for assistance in apparatus and material in order that they might commence operations in the same direction.

Dr. Hutcheon asked whether arsenic spraying was not dangerous to the stock.

Mr. Fuller said that as a result of the use of about 20 tons of arsenic two cows and a Kafir only had been killed. The cows were accounted for by the fact that undiluted arsenic had been sprayed on a small dairy paddock. The native died through having stolen a mixture of arsenic and treacle which was to have been used next day for locust destruction.

The President also testified to the efficacy of the arsenic spray.

It was pointed out by Cape delegates that the circumstances in Cape Colony were different, and that it would be next to impossible to spray the huge swarms which periodically devastated certain portions of the Cape.

After further discussion the motion was carried unanimously.

SOUTH AFRICAN UNIVERSITY.

Discussion ensued on the following resolution on the agenda: "That this Conference is of opinion that the several Governments and administrations of South Africa should be approached with a request for the establishment of a University for South Africa, in order that diplomas in law, science, medicine, etc., may be obtained," but ultimately it was agreed that it should be expunged.

UNIFORM PRODUCE RATES ON RAILWAY.

The Rev. Mr. Scott proposed: "That this Conference considers it desirable to obtain a uniform rate for colonial produce over the various South African railway systems."

Mr. Hutcheon thought it was a dangerous subject. It would be all very well if the colonies were united. At the present juncture they could do no more than affirm the principle.

The Secretary advocated the lowering of the Transvaal rates and raising the Cape rates on the principle that the railway should be run to pay. He as a Transvaaler was of opinion that the coast colonies should be placed at least on an equal footing with Delagoa. (Applause.) He thought they could do no harm in seeking to secure fair play all round.

Mr. Nel seconded the motion, which was carried by 15 votes to 5.

Congress then adjourned until the following morning.

SECOND DAY'S SITTING.

Congress resumed business on Thursday morning the 26th.

The President submitted a report of the Executive in which it was stated that the estimated revenue was expected to be £105 for the year. Printing would cost about £40. It was recommended that the Secretary's fee be fixed at 25 guineas for the year with a bonus, if funds would allow, not to exceed another 25 guineas. It was also recommended that in future the President, Secretary, Treasurer and Auditors be elected from residents in the Colony in which the Conference for that year is to be held. This report was adopted, and Mr. D. N. Eadie, Secretary of the Natal Agricultural Union, was unanimously elected Secretary for the present year. In consideration of past services Mr. F. T. Nicholson, the retiring Secretary was nominated as a Vice-President.

Mr. Malleson then invited the Union to hold its next Conference at Cape Town, and this was unanimously agreed upon.

STANDARD WEIGHTS AND MEASURES.

A resolution on the agenda "That this Conference is of opinion that it is desirable to establish standard weights and measures throughout South Africa and that all produce be sold by such standards," was adopted unanimously after discussion.

A motion urging the introduction of the Metric System was withdrawn.

RE-IMPOSITION OF THE MEAT DUTIES.

A long discussion ensued on the following resolution "That this Conference is of opinion that the meat duties should be re-imposed, where this has not already been done," which in the end resolved itself into a debate that threatened to include the whole question of protection.

On the subject of meat duties, an amendment moved by Messrs. Malleson and D. M. Brown (of the Cape) was adopted, this was to the following effect: "That public abattoirs with cold storage should be established in the stock centres, that an additional licence be imposed on butchers selling imported meat but that those dealing in Colonial meat should be free to trade without a licence. And that each Colony should deal with the meat duties as suits its local circumstances."

The resolutions and amendments bearing on protection were withdrawn on the ground that insufficient notice had been given to all the Colonies sending delegates.

AFTERNOON SITTING.

On resuming in the afternoon, resolutions relating to Native Labour supply for agricultural purposes, the publication of an Inter-Colonial Agricultural Journal, and the condemnation of the existing Customs Union were struck off the agenda.

ABANDONED VINEYARDS AND ORCHARDS.

Mr. Malleson proposed; "That the Governments be approached with the view of making it compulsory on owners to destroy abandoned vineyards and orchards." The mover contended that old vineyards and orchards spread plant disease in such a manner that it could not be checked unless the old plants were destroyed. Mr. Brown seconded.

Mr. Hutcheon said that the regulation would be very difficult of execution. It was difficult to make a man destroy his property, though he could be made to keep it in such a manner as not to hurt his neighbour's vineyard.

Mr. Fuller said this applied to "abandoned" vineyards and orchards, and not to carelessly kept orchards. An orchard abandoned was obviously so because it was unprofitable, and ought therefore to be destroyed. Notice would always be given to the owner that his orchard was in a bad state, and if he refused to see to it, then it legally became abandoned.

Mr. Hutcheon proposed, as an amendment: "That the Governments be approached with the view of introducing legislation to compel the owners of vineyards and orchards to take proper measures to keep them free from insect and other infectious pests, and that a suitable penalty be fixed for the violation thereof."

Mr. Malleson withdrew his motion in favour of the amendment.

Objection was raised by a Cape delegate on the ground that the viticulturists in the Cape were already doing their utmost, and to fine them would be adding insult to injury.

Mr. T. Smuts said that occasionally farmers were unable to go the length of eradicating pests in "way-back" vineyards.

Mr. MacDermott asked where the careful man came in, and where was his reward for keeping his vineyard or orchard clean, if his neighbour were careless and left his land full of pests, to re-infest adjoining properties?

Several Cape members advocated the necessity for leaving vineyards out of the motion, and to insert instead "fruit trees other than vines." This was carried.

MISCELLANEOUS.

The following resolutions were carried after the subjects had been fully discussed:—

"That this Congress urges upon the Governments the necessity for a reduction in ocean freights on agricultural machinery and implements."

"That imported artificial manures be carried over the railways at as low a rate as colonial artificial manure, and that both be carried at as low a rate as possible."

"That this Congress impresses the desirability on the Governments of placing spraying material on the same basis as sheep dip as regards duty and railway carriage."

An amendment was added in which farmers were required to certify what they meant by "spraying material."

• "That taking into consideration the large quantities of paraffin consumed as fuel for engines used for irrigation purposes, the Governments be respectfully requested to make enquiries and procure information with regard to the importation of Crude Oil in bulk, with a view to ascertaining whether it could, by this means, and the exercise of consideration with regard to import duties, be supplied more cheaply to farmers than the oil at present in use."

"That the Executive Committee be instructed to consider the question of Co-operation between Agriculturists and Stock Farmers, with a view to bringing the consumer and producer into closer touch."

"That this Congress is of opinion that there should be a reduction in the Ocean Freight and Railway Rates on Imported Stock suitable for breeding purposes, provided that such stock be eligible for entry in the South African Stud Book.

"That sellers of Imported Frozen Meat be compelled to label it as such."

CATTLE DIPPING AND DIPPING TANKS.

Mr. Power, Acting Principal Veterinary Surgeon for Natal, gave an interesting resumé as to what has been done in that Colony in connection with cattle dipping for the eradication of ticks. He said that dipping had shewn very satisfactory results in Natal. Government had constructed seventy tanks, of which fifty are now in use. In addition to this there are another seventy private tanks, nearly all of which are in use. The dip found most effective there is Quibell's cold water preparation, which is used at the strength of 1 lb. of the preparation to 9 gals. of water. This worked out at a cost of £5 16s. 8d. to fill a tank to a depth of six feet. They had tried many dips, but found this most satisfactory. Besides being used for cattle the dipping tanks had proved very valuable in the treatment of mange in horses.

The President, in response to a request of Mr. Hutcheon, gave the result of his experiences. The tank at Nel's Rust, the property he is interested in, was the first one constructed in South Africa, and they had found it most satisfactory. For the first six months they dipped their cattle every three weeks, but afterwards they found that once a month was sufficient. He does not hope for the entire eradication of ticks, but they should be able to get them under control. His estimate is that by dipping on his farm the ticks had been reduced by some seventy to eighty per cent. The dipping tank is not constructed by farmers in Natal for less than £100. As regards spraying he could say that for ten years he had tried it, using spray pumps and parafine and thoroughly spraying the animals, and his experience was that it was costly, and the animals soon became re-infested. He then sent to America for Dynamo Oil and used that, but it was not until he took to dipping that he was successful. He also mentioned that the dip he uses is the Imperial Queensland Farmers' Dip. In handling the cattle they can be put through the dip at the rate of 100 per hour. Some 2,000 head per month are dipped at Nel's Rust, and they put them through in two days.

Mr. Hutcheon said he had to confess to a little disappointment at hearing that their President was not hopeful of getting rid of ticks altogether. He (the speaker) has indulged the hope that this would come about in the course of time. (Applause). In fact, he has buoyed up the hopes of some of the Cape farmers in the tick-infested districts of the East Coast with that belief. His idea is that by putting cattle on the farms infested with redwater, heartwater, and other tick-transmitted diseases, and keeping up a regular course of systematic dipping they should be able in the course of time to exhaust the ticks—if not all of them, at least the pathogenic, or disease-bearing varieties. In fact he hears sometimes of farms becoming almost renovated by this means. It has always to be borne in mind that the tick can only reproduce its species by feeding on an animal. As to the most effective dip, it is generally known that the active ingredients in all preparations used for tick eradication are compounds of arsenic. Now, in the experiments carried on by the veterinary officers of the Cape Colony, it has been found that a solution of crude Arsenite of Soda is just as effective as the various compound dips in use. When dipping was first introduced, the general belief was that it was necessary for such a compound to be used as would maintain its action on the skin of the animal so as to prevent ticks from re-attacking them. The experience in the Cape was, however, that none of the compound dips really had that effect for any length of time, and that where ticks were sufficiently plentiful, there the animals became re-infested independent of the class of dip used. Again, their object in using dips for the eradication of ticks was to get as many ticks on the cattle as possible, and destroy them (the ticks) in the dip. It had also to be considered that where a dipping compound was used that is adhesive and maintains its action on the skin of the animal, the action of the arsenic it contains is also maintained on the constitution of the animal. Now, why should they attempt to do this knowing it to be injurious? He knew, of course, that some would say that some of the additions to the dipping compounds were put in to prevent the animals drinking the solution. He might tell them, however, that a very simple addition to the Arsenite of Soda solution would have the same effect and yet not be adhesive—and it would do no harm even if stock did drink a little of it. (A laugh). But he was not going to give that away just yet. (Renewed laughter). He is convinced that in Arsenite of Soda they have a dip which is both effective and cheap, and as it does not maintain the arsenical action on the skin of the animals, dipping can be carried out at more frequent intervals without risk of injury or loss. It is very necessary to have a cheap dip where a lot of cattle have to be handled, for that means that more dipping will be done and more ticks destroyed. (Applause).

The President was pleased to learn on such good authority that a cheap and effective dip had been evolved, and hoped it would prove completely successful. As to the complete eradication of ticks, he only spoke of his own farm where the conditions are against such an enterprise. He has bush and dongas and sluits to contend with, and, perhaps, if these were cleared, it might be possible to get rid of the ticks. (Hear, hear).

EVENING SITTING.

East Coast Fever.

Dr. Power, Acting Principal Veterinary Surgeon, gave information as to the method adopted in Natal in regard to dealing with the East Coast fever. Cattle from infected veld were removed to temperature camps, and no cattle were allowed to be moved from the vicinity of any infected veld.

S.A. Stud Book.

The Chairman made an explanation in regard to the position of Natal in respect to the S.A. Stud Book, remarking that the amount set down was deleted from the estimates last session, so that the fault of preventing Natal from being represented lay not with the Government or the Agricultural Union, but with certain legislators who were supposed to represent agricultural constituencies. He hoped that the necessary contribution would be passed by Parliment next year.

The Conference passed the following resolution :—" This Union is of opinion that the delegates here assembled should impress upon the Colonies they represent, and which have not already become affiliated to the South African Stud Book Association, the necessity and importance of joining the Association, and the great advantage to be gained by so doing."

Other Matters.

Dr. Hutcheon made a statement in regard to the history of what is known as the original Cape horse, and Mr. Nicholson informed the Conference that at a meeing in Bloemfontein a standard for the Boer horse had been laid down.

A resolution was carried calling upon the Governments of the several Colonies to take steps to deal with the spread of the bone disease (*Osteo Porosis*) in horses.

It was decided that the railway authorities should be approached with a view to concessions being granted to judges attending agricultural shows.

On the motion of Mr. D. M. Brown it was resolved:—"That it be remitted to the Executive to take into consideration the question of representation, so as to secure the fullest expression of opinion from each Colony, but that equal voting be retained, the Executive to retain power to act."

The next meeting of the Union was fixed for the first week in May, 1906, at Cape Town.

The Conference passed hearty votes of thanks to his Excellency the Governor, the Natal Government, the committee of the Victoria Club, and it was decided to forward a special letter of thanks to the Mayor and members of the Council for the hospitality extended.

The proceedings were brought to a close by a vote of thanks to the President, Mr. G. D. Alexander.

AGRICULTURAL SHOWS IN 1906.

The following dates have been fixed for the 1906 Agricultural Shows:—

Paarl, at Paarl, Thursday, January 25.
Stellenbosch, at Stellenbosch, Thursday, February 1.
Swellendam, at Swellendam, Wednesday, February 7.
Robertson and Montagu, at Robertson, Friday, February 9.
Worcester, at Worcester, Monday, February 12.
Bredasdorp, at Bredasdorp, Thursday, February 15.
Ceres, at Ceres, Wednesday, February 21.
Malmesbury, at Malmesbury, Wednesday, February 21.
Queenstown, at Queenstown, about last week in February.
Western Province, at Rosebank, Tuesday, Wednesday and Thursday, February 27 and 28, and March 1.
King William's Town, at King William's Town, Thursday and Friday, March 1 and 2.
East London, at East London, Wednesday and Thursday, March 7 and 8.
Aliwal North, at Aliwal North, Wednesday, March 14.
Bathurst, at Bathurst, Wednesday and Thursday, March 14 and 15.
Oudtshoorn, at Oudtshoorn, Wednesday and Thursday, March 21 and 22.
Albany, at Grahamstown, about the last week in March.
Port Elizabeth, at Port Elizabeth, Wednesday, Thursday and Friday, April 4, 5 and 6.
Cala, at Cala, the first week in April.
Bechuanaland, at Mafeking, Wednesday, April 18.

CEMENT DRAIN PIPES FOR ORCHARDS AND VINEYARDS.

An Economical and Workable Plan.

By Rowland Taylor, of M'Foshola, Wellington.

Drainage is a most important branch of successful farming, and farmers, here in the Western Province particularly, find the greatest difficulty in making durable drains in their vineyards and orchards. Some use vine cuttings, fir poles, and even bushes—making what are known as French drains—with very poor results, as most of these drains have to be opened up every second or third year, entailing no end of expense and being a constant source of worry and danger. Open sluits, again, require cleaning all the year round, and retard cultivation during the summer months, being at that time probably dry, while the trees or vines on either side suffer considerably.

I take the liberty, therefore, of forwarding a mould for making cement drain pipes, which so far have answered most successfully with me and can be made at a reasonable cost. At the same time there may be some readers who could offer suggestions and make improvements on this plan. The idea of making cement pipes in this district originated with Mr. Johnnie Le Roux of Lady Grey Bridge, and thanks are due to him for assistance given.

From his idea the present improved moulds have been made. Of course most farmers are not so situated as to be able to get sand to make a good pipe, but those who are I cannot too strongly advise to give these pipes a trial. The moulds could be made any size required and any carpenter will make them for 2s. to 2s. 6d. each.

We set about the work as follows, level off a bit of ground say 25 yards square, just so as to give a clean surface of loose soil. For 2in. pipes I use 5 of sand to 1 of cement. We mix this quantity up thoroughly first (dry). One man then mixes up in small quantities with water as required by the moulders. Three men mould, each having 4 or 5 moulds, a bucket of water and one with cement. They place their moulds touching one another and fill with cement then take the half round rod and work it backwards and forwards until it fits flush in the mould, the top is then smoothed with a trowel and the rod taken out. The other moulds are worked the same way, and when the last is finished, the man

Fig 1

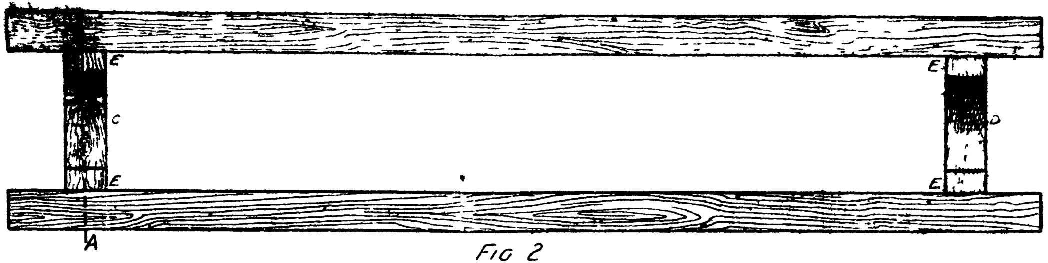


Fig 2

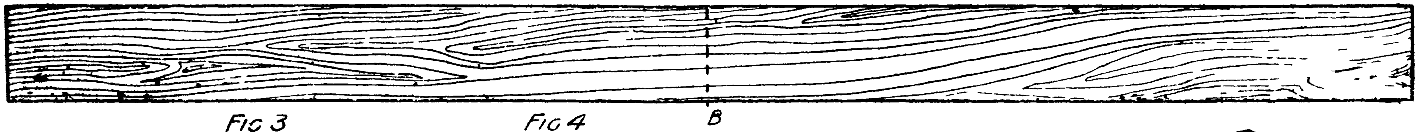


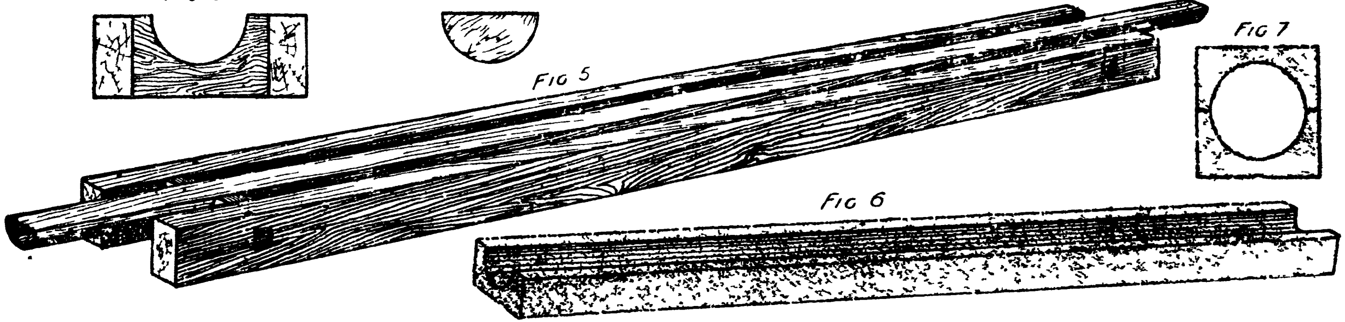
Fig 3

Fig 4

Fig 5

Fig 7

Fig 6



Description of Figures.

Fig. 2. Flat plan of Mould, C. D. grooves in which baton Fig. 2 fits, E E E.E space to be filled with cement Fig 3. Section through line A (Fig 3). Fig 4 Section through line B (Fig 2) Fig. 5. Construction Plan. Fig. 6. Section of Pipe moulded. Fig 7. Two Sections forming complete pipe.

commences with the first mould again, gently lifting it and leaving the pipe on the ground, with hollow side up. He thus removes all the moulds in rotation, dipping each in water and placing on the ground for the next lot.

We make three rows at a time, letting the best man get a start of a yard or two, the second man makes his row about 6 inches or so from first row. We water three times a day for first week.

The cost works out as near as possible as follows (I am taking an average on about 3,000 yards of pipes just made) :—

2 in. Pipes, 5 sand, 1 cement (one day's work :

4 men's wages, 2/6	£0	10	0
3 barrels cement, 15/-	2	5	0
	£2	15	0

1,500 pipes, 18 in. long, equalling 375 yards of closed piping, roughly 14/- per 100 yards.

3 in. Pipes, 4½ sand, 1 cement :

4 men's wages, 2/6	£0	10	0
4 barrels cement, 15/-	3	0	0
	£3	10	0

1,056 pipes, equalling 264 yards of closed piping, or roughly £1 6s. per 100 yards.

I have taken the outside cost of cement to cover any haulage, etc.

In laying these pipes a farmer who has the fall must please remember a 4 ft. drain is better than one of 3 ft., and the deeper he can lay his pipes the better to my idea.

There were wet places in my orchard, where trees have died, and the others grew most unevenly, in fact we could not get in to plough or cultivate for two or three weeks after a rain, but since putting in the drains, I can plough or cultivate any part of any orchard within 48 hours of our heaviest rains.

In making pipes I would advise the best of cement. The laying of pipes is easy, give them a fall, and where possible go to the trouble of covering, say, six inches or so with sand. It pays if you are going to do a job of this sort to do it well, and it will last for years.

THE SOUTH AFRICAN STUD BOOK.

The following circular to Members of the Cape Stud Breeders' Association has been issued by the Secretary:—

SIR,—The delegates (Messrs O. E. G. Evans, J. Rawbone and C. G. Lee) elected by you in July last, have the honour to report as follows:—

Item 1. That the Stud Book Conference met at Bloemfontein, O.R.C., on the 15th and 16th August, 1905.

Item 2. The Cape Stud Breeders' Association was represented on the 15th by Messrs. O. E G. Evans, C. G. Lee and J. Rawbone. The Cape Government representative being Mr. J. D. Borthwick, G.V.S.

Item 2*a*. The Transvaal Breeders' Association was represented by Messrs. C. F. Blackburn, F. T. Nicholson, T. Everard, M.L.C., and A. H. Malan. The Transvaal Government representative was unavoidably absent.

Item 3. The Orange River Colony Stud Breeders' Association was represented by Messrs. C. H. Wessels and H. W. Brown, the Orange River Colony's Government representative being E. J. Macmillan.

Item 4. Mr. C. G. Lee was elected Chairman of the Conference.

Item 5. Mr. E. J. Macmillan acted as Secretary.

Minute 1. Each Stud Breeders' Association represented at this Conference had two votes.

Minute 1*a*. Each Government had one vote.

Minute 1*b*. Thereby giving each Colony represented a total of 3 votes.

Minute 1*c*. But Conference agreed that such basis of voting should not be understood as a principal of voting at future meetings of this nature.

Minute 2. The South African Stud Book Rules adopted at the Inter-Colonial Agricultural Union Conference held in Pretoria, in July, 1904, issued by the Agricultural Department, No. 18, 1904, together with the Agenda drawn up by Mr. F. T. Nicholson formed the basis of the Conference.

Item 6. These Rules and Agenda were laid on the table.

Item 7. The Chairman pointed out that Stud Breeders' Associations represented had each appointed members to act on the Central Board, as provided for in Rule No. 5.

Item 7*a*. The appointed representatives being:

Item 7*b*. Cape Breeders' Association, Messrs. O. E. G. Evans, J. Rawbone, C. G. Lee and one Cape Government representative for the first meeting—Mr. Borthwick, V.S.

Item 7*c*. Transvaal Breeders' Association, Messrs. C. H. Blackburn, T. Everard, M.L.C. and one Transvaal Government representative.

Item 7*d*. Orange River Colony Breeders' Association, Messrs. C. H. Wessels. H. W. Brown and one Orange River Colony Government representative—Mr. E. J. Macmillan.

Item 8. The High Commissioner of South Africa was asked to become Patron of the South African Stud Book Association, and his Excellency accepted, to whom the Secretary conveyed thanks.

Minute 3. Conference unanimously expressed regret at the absence of the delegates from Natal and Rhodesia, and hoped soon to have their much needed co-operation.

Minute 4. The South African Stud Book Rules (referred to in Clause 2) from No. 1 to 30 were taken into consideration *seriatim*, after which the Agenda drawn by Mr. Nicholson was dealt with.

Item 9. The following was agreed upon for the guidance of the South African Stud Book Association, administered through the Central Board.

Minute 5. The Association shall be known as "The South African Stud Book Association."

Minute 6. This Stud Book Association shall consist of owners of stock and those interested in the breeding of such stock in each of the British Colonies of South Africa, viz., Cape Colony, Transvaal and Orange River Colony, and such other British possessions in South Africa as may desire to become affiliated, according to these rules.

Minute 7. The object of the Association shall be :—

Minute 7*a*. To encourage as far as possible the breeding within, and introduction into, South Africa, of pure bred stock of every description, also the perpetuation and development of useful indigenous animals, with a view to the establishment of such breeds of stock as a permanent South African possession, and to keep accurate and permanent records of such stock, in the form of a general Stud Book.

Minute 7*b*. To decide through the affiliated Stud Breeders' Associations, the stock deemed worthy of entry in the South African Stud Book, and to enter such stock under conditions hereafter laid down.

Minute 7*c*. To publish such information as the Association may deem necessary from time to time, as to pedigrees, etc., of thorough-bred stock.

Minute 7*d*. To correspond with persons and societies in the raising and perpetuation of thorough-bred stock.

Minute 7*e*. The pedigree registration of thorough-bred horses (race horses) be left with the Jockey Club, as heretofore, and that thorough-bred stallions required for stud purposes in connection with the breeding of the Boer horse, as well as other recognised breeds, may be registered in the Stud Book.

Minute 8. That the word "Council" be substituted for the word "Board" in Rule 5 and subsequently.

Minute 9. The administration of the Association shall be vested in a Council hereinafter known as the "Central Council."

Minute 10. The Central Council shall consist of representatives elected annually in the month of January by the Stud Breeders' Associations of each Colony, affiliated on the following basis: Associations with from 50 to 100 animals are entered in their manuscript Stud Book and Auxiliary Stud Book, to elect one representative; those with from 100 to 400 animals, two representatives; those with over 400 animals, to elect three representatives. Every member of the Council to be either a *bona-fide* breeder, an owner, or in responsible charge of stock registered in the South African Stud Book.

Minute 11. The Government of each Colony contributing to the affiliated Stud Breeders' Association within its own administration shall have the right to appoint one representative to act on the Central Council.

Minute 12. The Central Council shall open, and be responsible for, the correct keeping of a general South African Stud Book, and shall receive and make entries into this Stud Book in accordance with the details furnished from time to time by the Stud Breeders' Associations (hereinafter provided for) in any of the South African Colonies affiliated.

Minute 12*a*. The details referred to shall consist of entries made in the Manuscript Stud Books.

Minute 12*b*. That the General Stud Book be opened with as little delay as possible at the office of the Central Council, and that care be taken that all registration of the Stud Breeders' Associations be in conformity therewith, so that the details entered shall in all cases be identical.

Minute 13. The Central Council shall not recognise more than one Stud Breeders' Association in each Colony, provided that such Association be willing to subscribe to the constitution herein laid down; and further provided that such Association agrees to forward its proportionate share of funds to the Central Council.

Minute 14. The Central Council shall arrange for the numbering consecutively of all stock entered in the Stud Book and issue certificates of registration to the Registration Boards, to be ultimately sent to the owner.

Minute 15. Each certificate shall bear a uniform stamp recognised by each Stud Breeders' Association affiliated, and by the Government of the Colony in which the Stud Breeders' Association is formed.

Minute 15*a*. And the uniform stamp shall be registered in each Colony by letters patent, and thereby secured from any unauthorised use.

Minute 16. Each animal, with the exception of horses, entered in the Stud Book shall be marked with the letters "S.A." in monogram form. This mark and the number allotted to each animal by the Central Council shall be affixed to the satisfaction of some responsible representative of the Council.

Minute 17. The mark to be placed on the right ear of cattle, goats, sheep, pigs, behind or on the right wing of ostriches. If branded, the brand to be so placed as not to interfere with the Branding Acts of the Transvaal or any other Colony affiliated.

Minute 18. The Central Council may return to the affiliated Stud Breeders' Association any application for entry that the said Council may consider out of order or unsatisfactory, for explanation.

Minute 19. The Central Council to be supplied with a copy of all by-laws proposed to be adopted by any affiliated Stud Breeders' Association or their Registration Boards hereinafter provided for (before such by-laws are put into force) for the information of the Central Council.

Minute 20. All general rules as to the qualification of stock for entry into the Stud Book which may be issued from time to time by the Central Council for the guidance of the different Stud Associations shall be identical.

Minute 21. Meetings of the Central Council shall be held annually.

Minute 21*a*. Special meetings of the Council may be convened by the President upon the request of three members thereof. Not less than fifteen days' notice of such meeting, with an agenda of the subjects to be discussed thereat, shall be posted to all members of the Central Council and to the Secretaries of the Stud Breeders' Associations.

Minute 22. It is desirable that separate Stud Books shall be published for each class of stock by the Central Council; the price of each issue to be decided hereafter.

Minute 23. Uniform charges for the registration of stock shall be fixed by the Central Council.

Minute 24. The Central Council shall open a Stud Book wherein to enter animals of apparently pure breed (but without pedigree) for a probationary period.

Minute 25. The Central Council shall frame such by-laws for its own guidance as may be deemed necessary from time to time, provided that such by-laws are not in conflict with anything herein contained, and be empowered to alter, amend, or cancel any such by-laws after giving 30 days' notice to the Stud Breeders' Associations of any such adoptions, alterations, amendments, or cancellation.

Minute 26. The annual meeting shall be presided over by the President, and shall be held, as far as possible, in the various Colonial centres. In the absence of the President, the chair shall be taken by the Vice-President, and in his absence a chairman shall be elected from among the members present.

Minute 27. Horses entered in the Stud Book shall not be branded, but shall be known and described in the returns by their markings.

Minute 28. The head office of the Central Council shall be in Cape Colony.

Minute 29. The first annual meeting of the Central Council shall be held in the month of January on the date as fixed upon at the last meeting. Thirty days' notice of the holding of such meeting shall be given to each member at his registered postal address, to the patron of the Association, and to the Secretaries of the local Stock Breeders' Associations in each affiliated Colony. The Secretaries may be present at the meetings on behalf of their Associations, but may not vote.

Minute 31. The Chairman of the Central Council shall be convenor of all meetings of the Council.

Minute 32. The Central Council shall issue all certificates of entry in the Stud Book written on red coloured paper, while the certificates of entry in the Auxiliary Book shall be written on white paper.

Minute 33. It is considered inadvisable to open an Auxiliary Stud Book for horses, except for the registering of foundation stock of the Boer horse.

Minute 34. The forms of the registration certificates for the various classes of stock shall be as follows:—Horse, cattle, sheep, Persian sheep, angoras, ostriches, pigs, etc., and these certificates shall be consecutively numbered in each class, and an exact counterfoil kept in the Central Council's office.

Minute 35. All certificate forms shall be identical for all classes of animals. See appendix.

Minute 36. All certificate forms to be drawn up in triplicate in books of 500 pages with three certificates on one page.

Minute 37. In event of sworn declaration of the loss of any certificates, duplicates can be supplied by the owner paying the amount of the registration fee.

Minute 38. Transfer certificates can be given to any owner by paying half the amount of the registration fee.

Minute 39. That the S.A. Stud Book recognized stamp be "South African Stud Book Association" arranged in a circle.

Minute 40. S.A. be form of monogram used as the identification marks in respect of all animals in the register of every local Association as per Rule 13.

Minute 41. The agenda of the yearly meeting shall be in the hands of the members of the Central Council at least 21 days before the meeting is held, so as to admit of the Association which they represent informing them of their wishes in respect to any subject therein contained.

Minute 42. The agenda may consist of any subject which any local Association may wish to bring forward, and of such subjects as may be suggested by the Central Council. These subjects will all be in the form of drafted resolutions, and shall be forwarded to the Secretary of the Central Council at least 40 days before the annual meeting is held.

Minute 42½. Owing to the wide area covered by the Stud Book Association, and the great variety of subjects likely to affect its operations, it shall be competent for the meeting to allow the discussion of subjects not on the agenda, if these be deemed of sufficient importance.

Minute 43. That the following gentlemen, together with others who may be added in terms of Resolution No. 1, constitute the Central Council for the remainder of the current year, and that they remain in office till their successors have been appointed, viz.:—

Minute 43*a*. Messrs. O. E. G. Evans, J. Rawbone, C. G. Lee, F. D. MacDermott (being the Cape Government representative), C. H. Blackburn, T. Everard, and one Transvaal representative (Government), C. H. Wessels, W. H. Browne, and the O.R.C. Government representative, E. J. Macmillan.

Item 2. The Conference closed and the Central Council proceeded to elect office-bearers, all delegates present taking part in the discussion.

Minute 44. Central Council unanimously elected Mr. C. G. Lee as President. Vice-presidents elected were Mr. C. H. Wessels and the Director of Agriculture of the Transvaal.

Minute 45. Central Council adopted Congress Minutes—1 to 43*a*—as the objects and rules for the guidance of the Council, and passed the following resolutions:—

No. 1. The standards as decided upon by the Cape Stud Breeders' Association, for Angoras, Merino Sheep, Ostriches, and Persian Sheep were accepted. The standard for Africander cattle and Boer horses as drawn up by the Transvaal were accepted. Standards for other pedigreed cattle and horses be taken from their respective Stud Books.

No. 2. The President is hereby authorized to arrange for the Secretarial work of the Central Council, and see these duties carried out, and that a sum of £25 per month be allowed him for so doing until the next annual meeting of the Central Council.

No. 3. The President to act as treasurer until next annual meeting in January, 1906, or till his successor be appointed.

No. 4. The Stud Book's first volume editing committee to consist of Mr. C. H. Blackburn, Transvaal; Mr. J. Rawbone, Cape Colony; Mr. E. J. Macmillan, O.R.C.

No. 5. All printing for the Central Council to be given to one firm.

Item 10. Estimates framed for half year ending 31st December, 1905, by the Central Council, and adopted by the Council and the three Governments contributing.

Resolution 6.

Expenses for members attending meetings	£50	0	0
Secretary's salary	150	0	0
Stationery, etc.	20	0	0
Office rent	25	0	0
Stud Books	30	0	0
Office equipment	50	0	0
Miscellaneous	25	0	0
	£350	0	0

Item 11. Council allotted amounts to be contributed by the different Colonies, as follows:—

Resolution 7.	Cape Colony	£150	0	0
	Transvaal	125	0	0
	Orange River Colony	75	0	0
		£350	0	0

Resolution 8. The Council to interview the Jockey Club through a deputation with the view of discussing the matter of that Club handing over the pedigree portion of its Stud Book to the S. A. Stud Book Association. The deputation to be left in the hands of the President.

No. 9. That the acting Secretary write to the President of the Agricultural Union in Natal, expressing regret at their absence, and that under existing circumstances it seems impossible for them to join, but hope that they will not relax their efforts.

No. 10. That the Central Council's office be near Klipplaat Junction, at the residence of the President, *pro. tem.*

No. 11. All amounts of money paid to the Central Council shall be paid to and received by the Treasurer, who shall bank such amounts in the name and to the credit of the Central Council of the South African Stud Book Association, at the Standard Bank at Graaff-Reinet, until further notice.

No. 12. The President, who is the treasurer, is here empowered to sign cheques on behalf of the Council to meet current expenditure.

The President of the Central Council said that they had realized that there was a great work before them, but it was highly necessary work as an undertaking that had the approval of South Africa's High Commissioner, it had the financial support of at least three strong South African Governments, and he trusted that Natal and Rhodesia would join, and they had the co-operation of thousands of practical, wise, and determined stock-breeders. With such assistance and recognition they were justified in undertaking the work that lay before them, and which was the biggest undertaking yet attempted in the Stud Book world.

The scheme may be incomplete to carry on a work, much of which is perfectly new, and has not been tried in any part of the world under similar circumstances, but the principles are sound. If difficulties arise, it will be in the details; but with the support and co-operation we have, the work can be entered upon with a strong faith, and we will not be disappointed if success reveals itself gradually.

There is a wide field to work in; besides, we possess the experience of old Stud Book Associations, working in other countries, yet we are free from irksome traditions or ideas of older Stud Books, which sometimes hamper progress. The work in hand is of vital importance, because South Africa is a stock raising country, but much stock breeding is done in a primitive sort of way; at the same time we possess many up-to-date breeders, and these need encouragement, while the out-of-date ideas need replacing by more systematic and newer methods. The South African Stud Book Association can do the work of raising the standard of our stock thereby making them more profitable to the individual owner, to the state and to the world.

Issued for your information,—Yours, &c.
C. G. Lee, Secretary.

Error —*Minute* 43*a* should read after the word "Lee" "and one Cape Government representative" but Mr. MacDermott's name has been inserted because the Cape Government have appointed him as their representative, and have also agreed to Resolutions Nos. 6 and 7.

WATER MEASURES AND RAINFALL.

(By request of a Bulawayo Correspondent we republish the following article which appeared in No. 15, Vol. VII. of 1895.)

In connection with various operations in practical farming. conservation of water, rainfall and irrigation, the following measures and quantities may be found useful.

Water Measures.

1 Imperial gallon of pure water weighs 10lbs.
1 American or Colonial gallon weighs 8⅓ lbs.
1 Imperial gallon contains 277·274 cubic inches.
1 American or Colonial gallon 231 cubic inches.
5 Imperial gallons equal 6 Cape gallons.
1 cubic foot contains nearly 6¼ Imperial gallons (6·23).
1 cubic foot of water weighs 62¼ lbs. (62·212).
1 cubic yard contains 168¾ gallons.
1 Imperial pint of water weighs 1¼ lbs.
1 Imperial pint contains 20 fluid ounces.
6 wine bottles are reckoned to contain one gallon of water or 26¾ ounces each.

Rainfall and Irrigation.

1 inch of rain is 144 cubic inches to a square foot.
1 „ 1,296 „ or 4½ gallons to square yard.
1 „ 22,622 gallons to acre, 4,840 square yards.
1 „ 113 tons of 2,000 to the acre.
1 „ 14½ million gallons to square mile.

By an inch of rain is understood as much rain as would form a sheet of water one inch deep over the surface of the ground, if none of it soaked into the soil or ran off.

An inch of rain falling on a roof will be after the rate of a little more than half a gallon to the square foot.

As the slope of the roof makes no difference, a house roof will, when an inch of rain falls, collect a half gallon of water for every square foot of area the house stands upon.

So if a house is 40 feet long and 30 feet wide, the catchment area will be 1,200 square feet, and an inch of rain will supply to a cistern 600 gallons, allowing some 15 gallons for waste and evaporation.

If there is 20 inches of rainfall during the year, then with proper spouting and cistern room, the above mentioned roof or area would furnish during the year 12,000 gallons of water.

An inch of rain over an acre, of 4,840 square yards, being 22,622 gallons to the acre, it is a matter of some interest to get at the approximate quantity required for irrigating.

As I find that usually, even in a dry season, after 2 inches of rain have fallen, the land can be ploughed, I have suggested that 50,000 (fifty thousand) gallons be accepted as an estimate, the quantity required for irrigating an acre of land once.

Of course more or less water will be required according to the nature or staple of the soil, its dryness and powers of absorption. But still it is well to have a definite or approximate standard of measurement as to the quantity of water required, to be delivered by a pipe or furrow, or, it may be pumped, for irrigation.

In Spain the regulation quantity of water for one irrigation is 2¾ inches. This would be 52,210 gallons per acre.

It has been found in practice that one good watering is much better than two or three light ones. For unless the water soaks some way into the ground, it does not enable the crop to feed on the plant food in the soil. If only a little below the surface is kept moist, the roots of the plants will be encouraged to grow near the surface and suffer from the heat and drought, instead of penetrating deep into the soil and sub-soil.

Measuring the delivery of water as to quantity supplied in a given time, has been a question of some consideration, enquiry, and experiment.

The fact or difficulty to be dealt with is that the quantity of water delivered over a weir or through a pipe or any other kind of aperture *constantly* varies with depth or pressure of the head of water whence it is derived.

For instance, the quantity of water which is delivered through a four-inch pipe with *two* feet of water above the orifice will be 354 gallons per minute while the quantity delivered through the same pipe with a head of *one* foot of water would be only 250 gallons per minute, being a difference of 1,240 gallons per hour.

So the problem to be solved was to invent or arrange some plan by which the water should always be delivered under the same pressure which would be secured if always the same *head* or depth could be maintained.

In Italy this water measure is called a *module*. The principle of which is, that a stone trough is filled from the canal, river or spring, in which trough or module the water is always kept at one state of fulness or level, and so maintains the same pressure and consequently delivers exactly the same quantity of water at all times and in perpetuity.

In the United States of America the law of water delivery provides for the construction of a "module."

Water is sold by the *square inch*, that is the quantity which will be delivered by each square inch of the aperture through which the water flows. An orifice one foot long and two inches high, thus delivering 24 inches.

The law provides that "water sold by the inch by any individual or corporation shall be measured as follows, to wit, every inch shall be considered equal to an inch square delivery orifice under a five-inch pressure, and the five-inch pressure shall be from the top of the orifice of the box (module) to the surface of the water." This will give a constant pressure of four inches.

A module thus constructed, and with this pressure, will deliver through *every square inch* of the orifice 7½ gallons (Imperial) every minute, and 450 gallons per hour.

A four-inch pipe under the same pressure, will deliver 94 gallons per minute.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome

Questions are also invited. In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month. Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible

All letters or contributions should be plainly addressed "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown," they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication

Agricultural Banks

To the Editor, AGRICULTURAL JOURNAL

SIR,—The Agricultural Department has issued a leaflet proposing the establishment of local co operative credit societies, which might borrow money at 4 or 5 percent, and lend it to farmers at 6 per cent, the loan being for a definite time, and the interest payable at the same time as the principal This plan would be useful in some cases, but 6 per cent is too high. Why should not the Government lend money at 4 per cent it can borrow at less than that, and the margin would cover expenses? The loan should not be called in so long as the interest were regularly paid. This plan would be of very great assistance to the farmer, for he would be free from the disadvantages of borrowing from joint stock banks or private persons, who often call in the loan at a time when it is difficult or impossible to raise another, and who increase the rate of interest in bad seasons or periods of depression, these being the very occasions on which the farmer needs help It is to the advantage of Government to support the farmer, provided it does not lose money over him, this can be prevented by care at the time of issuing the loan A bank or money lender on the other hand exacts its high interest without mercy, and has no compunction in pressing hardly on the farmer, in many cases bringing him to ruin unnecessarily —Yours &c

AGRICOLA.

Stellenbosch, Nov 18

Arsenite of Soda for Cattle Dipping.

To the Editor AGRICULTURAL JOURNAL

SIR —I should be very glad to know if Arsenite of Soda for dipping cattle will keep in the tank for future use, and how long if covered up?

Also, I would like a plan and the way Mr Llewellyn J Roberts, of Cottesbrook, prepares his dip as we are building a cattle dip

I only want the plan of the boiling water and mixing the dip (I suppose he uses Arsenite of Soda) and if it loses its properties by keeping in the tank —Yours, &c

J. H BINNINGTON.

Mandileni, Mount Frere,
October 26, 1905

In last month's *Agricultural Journal* **the first question raised here was answered in the following words "The dip will not lose its strength with age Arsenite of Soda makes a perfect solution with water, and if the tank contains a certain strength of Arsenite of Soda per gallon of water at the start, it may contain much less solution after a fortnight's dipping, but the residue in the tank will still contain the original percentage of Arsenite of Soda" This is the actual position provided the solution is used regularly Of course if a dip were filled and the contents left standing, the water would evaporate in the course of time, and the strength of the remaining solution be increased.** But for **practical purposes this contingency may be dismissed.**

With regard to mixing the solution, Mr Storey, in his report in the October issue of the *Agricultural Journal* says:—"In preparing the Arsenite of Soda dip it is

ecessary to dissolve it in boiling water. One gallon of boiling water dissolves 3 lbs. of he Arsenite; after which it mixes freely with cold water. The strength used (for ipping) is 1 lb. in 20 gallons of water or 5 lbs. in the 100 gallons." In actual practice it is found best to place the Arsenite of Soda in cold water, 3 lbs. to the gallon, and boil till quite dissolved. Then by pouring this one gallon of saturated solution into 59 gallons of cold water the required strength is obtained.

Chinkerinchee.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Having seen in the newspapers that in the Western Province a poisonous plant of the above name is growing amongst the oathay, will you kindly give a description of that plant in the *Agricultural Journal* for the benefit of the oathay cultivators in the Eastern Province? In some of the coast districts oathay growing is our main support.—Yours, &c.,

G. L. VAN NIEKERK.

Descriptions of this plant and warnings as to its poisonous nature have been published several times in these pages. We are now preparing coloured illustrations showing its exact appearance; which we hope to publish in our next

"Back to the Land."

To the Editor, AGRICULTURAL JOURNAL.

SIR,—One often hears it said that the farmers are the backbone of a country, and certainly to an ordinary mind this is the natural conclusion arrived at after careful consideration of the question of "how we live."

It is also frequently contended by our politicians and others that amongst our farming community there is a great need of new blood,—young men of progressive ideas, keen intelligence, clean physique, and great energy, and as there is a distinct tendency amongst many young men now a days to turn their eyes from the bustle, worry, and turmoil of a city life to the more tranquil existence of the agriculturist, I would ask you to be good enough to open your columns to a discussion of the subject, so that those of us who are disposed to get "back to the land" may learn something of the joys and sorrows, successes and failures which await us should we make the change.

Not only in the columns of general correspondence, but also from your own able pen I would venture to ask for the subject to be treated, and if you could arrange for a series of articles dealing exhaustively with the subject, I think you would be doing a good turn to the country in general and to intending farmers in particular, chief amongst whom is,—Yours, &c.,

A CONSTANT READER.

If "Constant Reader," or anyone else desirous of information, will state a specific case, we shall be pleased to give any information at our disposal. But there are many other subjects of more pressing importance, agriculturally, than the compilation of uch a series of articles as suggested

Scurvy amongst Pigs.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Can any readers of your widely-circulated *Journal* inform me, or suggest, through the medium of its pages, the best means to cure pigs of scurvy, especially sucklings about three to six weeks old? We have a large stock of pigs on hand (always about 500 or 600). Our pigs have been very healthy (especially the sucklings) until quite recently, when they started getting scurvy. I tried a good few dips, but without success. The sows are well fed with cooked mealies and sheep paunches Further, they are kept in clean styes with plenty of clean dry straw.—Yours, &c.,

R. S. DE VILLIERS.

Porterville Road, Oct 31.

The best treatment for this disease is rubbing the affected animals with Sulphur Ointment and giving Sulphur in the food. Take, to every pound of unsalted lard, four ounces of Sulphur and one teaspoonful of tincture of Iodine, first rub up the lard and Sulphur, then the Tincture of Iodine drop by drop. Give powdered Sulphur (Flowers of Sulphur) in the feed three times a week in such proportions that every full grown pig gets a tablespoonful and pigs to six weeks old a teaspoonful each. Clean out pens thoroughly and see that pigs can get shelter from the sun when smeared with the ointment, dress three times, then wash off if necessary.

W.R.

Judging the Judges Again.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—One of our ewes entered as "Fine Woolled" was disqualified at the last Grahamstown Show as being "Robust" (one judge, Mr. Cumming, dissenting we understand.)

As this ewe had been sold to us by Mr. W. H. Gibson, Fairfield, Tasmania as "Fine Woolled," and as it has taken prizes in Tasmania, Cape Town and Port Elizabeth in the fine wool section, we decided to send its fleece to London for inspection, and we shall be obliged if you will publish Messrs. Charles Balme & Co.'s report which we enclose.

The fleece had nine months' wool and weighed 20 lbs.—Yours, &c.

C. ADAMS & SON.

Glenroy, Tarkastad,
October 30th, 1905.

COPY OF MESSRS. CHARLES BALME & CO'S REPORT DATED 20TH SEPTEMBER, 1905.

The wool is undoubtedly a true merino. The quality of the wool is distinctly fine, but the staple is rather short, very "tippy" and yolky. It is densely grown, and the general characteristics of the fleece are similar to those noticeable in a merino wool. The only portions that can be termed rough or coarse are those towards the points of the fleece, and these are not actually coarse, being only the degeneration of quality which is always noticeable in merino wools towards the extremities of the fleece. The term "robust" as applied to merino wools usually means a long staple (say a good three inches) of a not particularly fine character, which certainly cannot be applied to the fleece which we have examined.

Hydated Cyst in the Brain of a Cow.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have just lost a cow, and should be glad to know for certain the cause of death. Two days after calving she walked with a slightly arched back, which I put down to a strain, as she had cleansed all right.

She got worse for a week, when she slightly staggered sideways to the right, head inclined to the left.

The natives said "Lamziekte." A neighbour said "Not cleansed." We drenched her with 1 lb. Glauber Salts, 2 lbs. Salt, 3 tablespoons Ground Ginger, 1 teaspoon Laudanum, in 6 bottles water. She did not purge.

I tempted her to eat some grass, bone-meal and steamed oats, and there was a marked improvement for three weeks, when she got worse again. I drenched her again, but she would not eat or drink, and stood with a hanging head with saliva running in a great quantity from her mouth. In four days—that is to say in 24 days from calving—she began to go round in circles, pivoting on her hind legs. This got worse, particularly when we fed her on mealie meal and water poured down her throat. I also added a little bonemeal to the mixture.

This went on until the night of the 29th day, when she started about five o'clock to turn round. I then fastened her to a post, but she fell over, so I let her loose again, and she turned then from 5·30 until 12·30, when I went to bed.

The cow was lying down seemingly dead next day, but lived until 11 p.m., when all the staring mad look went out of her eyes, and she tried to get up, but died instead.

On opening the body all the organs were healthy. The stomach (fourth) and the passage to the third were full up (thousands) of worms, like the end of a lob worm cleaned for fishing, also a piece of bone about the size of half-a-crown.

In the head over the brain between the eyes there was a lot of sticky yellow fluid, quite clear.

The milk flow continued until death, and the calf was well nourished and healthy. Was the milk fever or worms the cause of death, as none of my neighbours or natives have seen a case like is?—Yours, &c.,

A. Robinson.

Warrenton, Nov. 11.

The cow suffered from the presence of a hydatid cyst on the brain in the same way that sheep and goats suffers in Turn-sick or Malkop. See *Agricultural Journal* for August, 1904, page 119.—D. H.

Catarrhal Pneumonia in Sheep.

To the Editor, Agricultural Journal.

Sir,—In the last issue of your Journal I noticed a letter from Mr. S F. Lautré, asking for information on the above. My opinion is that it is caused by a badly administered dose of Cooper's powder and salt when dosing for gallziekte Years ago, before this preventive was used, I do not remember seeing or hearing of a case as described by Mr. Lautré but only recently, since dosing with Cooper's and salt for gallziekte has been generally adopted throughout the Colony, so has this disease appeared, and increased in proportion. Shall be glad of the Chief Veterinary Surgeon's opinion.—Yours, &c.,

Interested.

Tylden, October 20th.

If in administering a dose of Cooper's Powder and salt to sheep, any of the mixture should enter the larynx and pass down into the bronchial tubes, it would cause acute broncho-pneumonia the same as any other irritant would. But acute broncho-pneumonia is not Jagziekte. Besides, Jagziekte existed amongst sheep in this Colony before Cooper's Sheep Dipping mixture was used as a medicine for Gallziekte —D.H.

Failure of Pines at Cathcart.

To the Editor, Agricultural Journal.

Sir,—1.—Will you kindly inform me why my little pine (Insignis) plants—or a great percentage of them—die off when they are about two inches high ?

2.—And how I can prevent it ?

3.—What size should they be when ready to take out of the seed bed and put into tins ?

4.—Should the seed be soaked (in warm or cold water) before sowing or simply put in as they come from the cones?

Thanking you in anticipation—Yours, &c.,

John King.

Rockford viâ Cathcart, October 19th.

(1) The little Insignis pine plants may be dying off from what is known as "Damping off," or from some other cause. The Insignis-pine is a climatic exotic at Cathcart, and those who grow it there should not be surprised if it is not quite hardy.

(2) The remedy for the Pines dying off will depend on the reason for it, and it is impossible to say what this is without seeing them. There is a Forest Officer at Cathcart, and the obvious course will be to consult him.

(3) Pine plants may be pricked out from the seed beds into tins when from one to two inches high.

(4) The seed should be put in just as it comes from the cones. It does not require soaking in warm or cold water —E. Hutchins, Conservator of Forests, Cape Town.

Tree Planting in Bechuanaland.

The Conservator of Forests, Cape Town.

SIR,—Will you kindly inform me :—

1. When will be the best time to sow Beefwood seed in the district of Vryburg?
2. Do you think that the young Beefwood plants will withstand the frost in that district (large trees do.)?
3. Which is the nearest Government plantation to supply forest trees to Vryburg District?
4. Can you supply me with 2 lbs. Beefwood seed, and at what price?
5. What time of the year must "Karee" tree (a native of Bechuanaland) seed be sown up here?
6. Can your Department supply seed of that tree?
7. Can the "Vaal Bosch" and "Rosyntje Bosch" (both native shrubs of the district of Vryburg) be propagated from seed? When is the best season to sow? When can seed be procured?
8. Will "Vaal Bosch" grow from cuttings, and how will transplants answer?

"Vaal Bosch" has dense foliage, and I wish to grow it as a hedge up here (Vryburg district) for wind break. It flowers in winter, and I think will answer as a protection to gardens, fruit trees, etc., against the cold south winds, which is the great trouble in that district.

If you will kindly give me your experience per letter as soon as possible I will be greatly obliged.

Yours obediently,

J. FRED PENTZ.

P.S.—If you like you can hand this letter to Editor *Agricultural Journal*, and we may get the experience of other people also.

1. The best time to sow Beefwood in the district of Vryburg would be about now, or when the spring rains come. The seed should be sown in tins, which can be kept in the shade and carefully watered. As the young plants come up and develop they should be removed into the full sun.
2. The young Beefwood plants (*Casuarina leptoclada*, etc.) should be protected from frost with lathing—a light frame carrying spars which will exclude about half the sun by day and a portion of the radiation cold by night.
3. The nearest Government plantation to Vryburg is Hanover.
4. Beefwood seed (*Casuarina leptoclada*) can be supplied from the Government seed store, Cape Town, at £1 2s. 6d. per lb.
5. Karee or, more correctly, Kri (*Rhus viminalis*) should be sown with the setting in of the rains, and treated as described above for Beefwood
6. There is no Kri seed in stock.
7. The trees mentioned could no doubt be propagated from seed, but I have no experience with them. The seed should be gathered as it ripens on the bushes and sown with the first good spring rains. If there is any difficulty in propagating Vaalbosch and Rosyntjebosch, two good substitutes are Chinese privet (*Ligustrum chinensis*) and *Hakea saligna*. The latter makes a magnificent hedge in Johannesburg, and is as dense and more green than the well-known Australian Myrtle hedges in the Cape Peninsula.—D. E. HUTCHINS, Conservator of Forests.

Windmill Pumping.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I should like to ask "Apex's" advice with regard to the following :—

I wish to erect a windmill to pump 3,000 gallons per hour from a borehole to a dam 100 yards distant, the level of which is 12 feet higher than the ground level of the borehole. What size of piping would it be advisable to use under the circumstances? Would there be any advantage in pumping immediately into an overhead tank (alongside borehole) from which the water would flow by gravitation into the dam.—Yours, &c.,

PAGAMUS.

Dewetsdorp, O.R.C., Nov. 15.

The Working of Turbines.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I should be glad if "Apex" or anybody with a knowledge of water turbines could give me information on the following:—Using a "Vortex" or other suitable make of turbine with a 12-inch feed pipe and a 12-foot fall to work a three-throw pump to deliver water through a 4-inch pipe up a gradient 430 yards long and 70 feet lift,—what amount of feed water is required per hour, and what amount of water may one expect to be delivered at the top of the gradient?—Yours, &c.,

TURBINE.

Dewetsdorp, O R C., Nov. 1

Branding Fluid for Cattle.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Seeing in your last issue the inquiries of Mr. Fred. Versfeld *re* the branding of cattle, we think that our experience might be of some use.

About two years ago we branded some cattle with branding fluid, and they still have the distinct brand. Shake the bottle, pour some of the fluid into a shallow vessel (a tinplate), put your branding iron or wooden stamp into the fluid, then apply to the animal. Dip and apply the iron two or three times, making sure that the fluid penetrates to the skin.

Drive the animal out of the kraal so as to prevent rubbing against the others until the brand is dry. The branding fluid is procurable from Mager & Marsh, chemists, Queenstown or Cathcart.—Yours, &c ,

HART BROS.

Ailsa, Thomas River, 17th Oct., 1905

Blindness in Sheep.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have been very much worried, about my sheep this season, which have been greatly troubled, with blindness. I first noticed the disease in a flock of hamels, about four months ago, but, did not attach much importance to it, thinking, that it would soon pass off again. However, the cases have been steadily increasing, and the disease has now broken out, in a flock of lambs and ewes. I may say, that these two flocks, have never become mixed on any occasion. I have tried several remedies,—Nicotine, Sulphate of Zinc, and Eyewater, but with no success *Symptoms*:—At first a slight watering of the eye is seen, as in the case of any sore eye A couple of days later, the eye becomes very inflamed, and the sheep shews signs of blindness. Lastly, it becomes quite blind, and a white skin forms over the eyeball. I have had them remain stone blind for three weeks or more, and naturally when they regain their sight, they are in a very low condition on account of all the handling and knocking about, they have sustained. Ground glass has also been recommended, to cut the skin from the eyeball, but if possible, I should prefer stopping the inflammation, before it reaches that stage.

Could you give me any information, as to the cause, or suggest a remedy?—Yours, &c.

"A BEGINNER."

Fort Beaufort, Oct. 27.

When it is first noticed that the eyes of the sheep are becoming inflamed the affected animals should be caught and their eyes dressed, the lids daily or oftener, if the number affected is not large with the following lotion:—Boracic Acid, 40 grains; Sulphate of Zinc, 16 grains; Distilled or Rain Water, 8 ounces. If the sheep seem in much pain add to this one ounce of fluid Extract of Belladona. After the acute inflammation has subsided, *i.e.*, the mucous membrane has ceased to appear red and weeping, blow into the eye every third day a little powdered Calomel, using a small glass tube or a paper spill. The best way of applying the lotion is to use a small glass syringe, *gently* close the animal's eyelids, *gently* insert the point of the syringe at the one corner and squeeze piston until the instrument is empty. As this affection is considered infectious the affected animals should be herded by themselves in a cool dark place. Do not use powdered glass or sugar.—W.R.

The Castration of Bull Calves.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I should be grateful for Dr. Hutcheon's opinion on the following points:—

(a). The best time to castrate calves born between June and October, *i.e.*, this season.

(b). Whether castration by firing is recommended for cattle, and whether same clamps, etc., could be employed as those described in the September issue of your *Journal* for use in the case of horses.—Yours, &c.,

"NOVICE."

Darling, October 28.

Bull calves, unless they are intended for draught oxen, should be castrated before they are three months old, but if the weather is suitable, and the calves are healthy, they should be castrated before they are a month old, the earlier the better. The precautions necessary are to avoid cold, windy, or stormy weather, and to carry out the operation with every precaution as to cleanliness. The hands of the operator and his instrument should be clean; the scrotum of the calves cleaned with a disinfectant before operating, and the calves require to be kept in a thoroughly clean shed or hock afterwards. The septic swellings which often follow the operation, are due mainly to the filthy condition of the place in which the calves are kept, especially if it is badly ventilated. Under such conditions the atmosphere becomes saturated with septic organisms, which enter the wounds and cause the putrid swellings which follow. The different methods of operating, are simply different methods of preventing bleeding from the blood vessels of the cord after the operation. The simpler the method the better. In young calves and lambs in which the tissues are delicate and less resistant than in older animals, the vessels of the cord are easily ruptured by simple traction. In my younger days, the shepherd, when castrating the ram lambs, used to cut off the bottom of the scrotum or bag, press up the remaining portion, until both testicles were fully exposed; these he then grasped in his mouth, and drew them out by a firm, steady pull with his teeth. The farmers may prefer to use their hands for this purpose. In older animals the vessels are not so easily ruptured by simple traction, and to attempt it, the parts are liable to be injured. In these cases the vessels of the cord should be severed by scraping. This is more efficiently done if, when the testicle is set free, by dividing the muscle at the side of the cord, the operator takes the loose testicle and gives the cord a couple of twists before scraping it

There is much less danger of bleeding after castration in cattle than in horses; the particular method of operating, therefore, resolves itself into the preference of the operator.

The one essential consideration after preventing hæmorrhage, is to dress the wound with some antiseptic such as Iodoform ointment, strength: 1 of iodoform to 16 of prepared lard. Or carbolic oil freely applied.

D. HUTCHEON.

Worms in Sheep and Goats.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Would you kindly suggest a remedy for hairworm or "dikkeel" in sheep and goats. Last summer there was an enormous loss of sheep and goats in the district of Malmesbury; it was a very dry summer, as you know; and according to my experience the disease is always more fatal in times of drought. I have tried various remedies, but have failed to find one that checks and cures the disease. The best thing to do is, I think to dose the animals with a mixture of blue-stone and water (one tablespoonful of blue-stone to a quart of water) a few spoonfuls at a time, but the sheep seem to suffer a good deal through it and to pine away gradually. You would render a great service to me and my district by suggesting a remedy for combating this terrible disease and let us know what causes it.—Yours, &c,

E. J. LOUBSER.

Doornfontein, District, Malmesbury
24th October, 1905.

In the last issue of the *Agricultural Journal* we published an exhaustive article on the above subject to which we refer our correspondent. His special attention is directed to the change in the strength of the bluestone mixture made by Mr. Hutcheon, C.V.S.

Citrus Growing—The Question of Stocks.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Just a line to say how pleased I am with Mr. Flanagan's paper on Citrus growing in the Eastern Province which appears in Vol. 27, November 1, 1905, of your *Journal*. It is a very interesting paper and should be of much benefit to intending Citrus growers. If they take his advice I don't think they could do better. He said a lot about stocks to work the orange on and I agree with him in all he has said about stocks and grafted trees but I am rather surprised that he has not given his opinion on the seedling orange as a stock. The object of my writing is to ascertain if possible whether the orange is or is not a good stock.—Yours, &c.

J. R STAPLES.

Clumber, Nov. 17, 1905.

RURAL REPORTS.

For the month ending 15th November, 1905.

Bedford.—Rainfall for this month has not been up to the average. Prevailing weather is dry, with a great deal of heat and somewhat windy at times. The veld is in unusually good condition, grass rather scarce, but Karroo in grand order, very long and ripe A good deal of wheat has been sown in this district. Oats are coming on well and large crops are expected. A heavy crop of lucerne has been cut, and second crop is promising. Livestock, generally speaking, are gaining fast in condition. Slaughter animals still scarce. Sheep are in very good condition, and the lambing season has been a good one. Slaughter stock are fairly plentiful and in good condition. Goats are also in good condition, and kidding fairly well. If rains continue, kids which are at present healthy should grow fast. Ostriches are doing well and chicks have come on fast.

Carnarvon.—We are having warm weather, but nothing unusual. An average rain has fallen, and veld is still in poor condition. Flocks are being moved to find veld and water. Wheat crop looks poor, and is suffering from rust. Cattle are in poor condition. Horses in good condition and prices high. Sheep and goats are in poor condition and scabby. No breeding.

Oudtshoorn.—The rainfall here for the past month has been about, but not above, the average. The veld is in excellent condition, and no locusts have as yet put in an appearance. The weather has been warm on the whole, in parts of the district there have been windstorms, which have done much damage to vines and fruit trees. Good crops are expected and being harvested. Except where damaged by wind, fruit promises well Vines are all on Cape stocks. Livestock of all descriptions are in good condition and free from disease. Riding horses fetching £20, draught animals £30, and upwards, mules £20. Markets firm. Ostriches have bred well this season, and pluckings are promising.

Queenstown.—The first half of the month was rather cold, the second half very windy, dusty, and hot. The rainfall was very light and a long way below the average. The veld is at present in good condition, but is beginning to wither on account of the heat, and requires more rain. Good crops of wheat and oats have been sown and are looking well, but the dry weather is beginning to tell on them. Lucerne is coming on nicely, but also requires more rain. Fruit looking well. Cattle are improving fast in condition; the calving season will be bad, however, owing to the past drought. Horses, etc., improving. Sheep in very good condition. Lambing not quite up to the mark.

Robertson.—Rainfall light and partial. Veld is in fairly good condition at present, but getting dry. Weather warm. The wheat, oat, and barley crops are about an average. Lucerne in very good condition. Fruit on the whole promising, though some considerable damage has been done in places by the wind. Vines promising, all Cape stocks. Live-stock of all descriptions are in good condition and doing well.

Somerset East.—Splendid rains fell throughout the district last month, and an average rainfall of upwards of seven inches was registered Pasturage is abundant, crops of cereals are excellent, and oats give promise of an exceptionally heavy yield. Fruit trees are heavily laden, but unfortunately Aphis has made its appearance amongst the peach trees. All live-stock very much improved in condition. Lambing season has been fairly good. Ostriches are in good condition. Breeding season was not a success owing to heavy rains during hatching. Locusts have unfortunately been hatching on the farm Bothas Kraal, in Zwagers Hoek ward, but thanks to the energy of the owner of the farm who was successful in trenching and destroying five swarms, damage will probably be averted. The outlook is most promising.

THE TRANSKEI.

For month ending 31st October, 1905.

Cofimvaba.—Rains fell during the first half of the month, followed by fine warm days, and ploughing has been extensively carried on the whole month. More land has been brought under cultivation this season than for many seasons past, and the outlook as to good crops next reaping season is better than it has been for some years. No reports have been received of any outbreak of disease amongst stock, and all are in good condition.

Idutywa.—There is nothing fresh to report for the month of October, 1905. We have had good rains, and the pasturage is good. A lot of ploughing has been done. The forage and barley crops are coming up nicely. Stock of all kinds are in good condition.

Kentani.—During the month there was a great rainfall which was registered at 11·89 inches. The natives are energetically ploughing their lands and sowing mealies and kafir corn but principally the latter. The prospects of a good harvest are therefore good. The pasturage is in excellent condition and there is not so much disease amongst cattle as formerly.

Komgha.—We have had splendid rains during the month which has done a great deal of good. The forage crops look well, also the little wheat that has been sown looks very promising. It is a pity that the natives in this district, do not sow wheat and oats. All they think of is cultivating mealies and Kaffir corn. Now the warm weather is coming in, the *tick pest* is commencing to trouble the stock. I tried to persuade the natives of the Government Locations to collect money and get a tank built to dip their cattle in but it was no use.

Matatiele.—The past month has been characterized by hot parching winds and an entire absence of rain. The veld in some parts of the district is worse now than it was in the middle of winter and unless rain falls pretty soon, a very serious state of affairs will obtain. After the seasonable showers in the early part of September ploughing operations were conducted with great vigour both by Europeans and Natives alike and the crops put in gave every promise of an abundant harvest but this prolonged drought has withered everything and unless it breaks speedily, fresh grain will have to be sown when the rain does eventually come. A case of tulip poisoning occurred in a team of 16 transport oxen during the month but I am glad to report that only one beast succumbed. The district is free from cattle disease and all descriptions of stock are in fair condition considering the poor veld.

Mount Frere.—There were nice rains on the 7th to the 9th, since when there has been no rain. Ploughing operations were proceeded with vigorously up to about ten days ago. The ground is now too hard to continue. All stock is in an excellent condition and the veld could not be better. There have been no fresh outbreaks of disease. Scab in horses has abated and there is hardly any in sheep, in fact, I believe the District is nearly clean. There is every indication of a good season.

Ngqeleni.—There was a large rainfall during the early part of the month, but very little towards the end. The Natives have ploughed and sowed particularly early this year and the new crops of mealies are already shewing above ground. The veld is good and stock of all descriptions are in splendid condition. No infectious diseases have been reported.

Nqamakwe.—The early part of the past month was very rainy, and some losses occurred in sheep in consequence of heavy and cold rains which were experienced. The season, so far, is the most promising known for many years, and the Natives are busy ploughing in every part of the district. Outbreaks of lungsickness have been reported from several localities; otherwise the state of the stock is normal. Locusts have not made their appearance.

Qumbu.—During the early part of the month heavy rains fell and ploughing became the order of the day. Since then, however, rain has been conspicuous by its absence and the veld is being scorched up by a long spell of terrific heat. Stock are in good condition and "Sitwayi" seems to be less prevalent among horses and cattle.

Tabankulu.—A fair amount of ploughing was done after the recent rains, but for more than a fortnight the weather has been very hot and dry. Very little sowing has been done as yet, the Natives preferring not to plant so early owing to the ravages of the grub. The pasture is still looking well in spite of the heat, and stock are in good condition.

Tsolo.—The heavy rains which fell in the early part of the month and were succeeded by a long spell of dry weather had the effect of caking the soil and preventing the egress of the seed then in the ground. The result is that the Natives are, in a good many portions of the district, re-ploughing the ground and putting in fresh seed. The veld still continues to be good. Stock are in splendid condition, and no cases of contagious diseases have been reported during the month.

Umtata.—Several showers of rain have fallen during the month and pasturage is plentiful. Growing crops are looking well, and give promise of abnormal yields—particularly in regard to forage. There is also every prospect of having an excellent fruit season. Stock is healthy and in splendid condition, although isolated outbreaks of Sponziekte and Meltziekte in cattle have occurred.

Willowvale.—Stock is in splendid condition. The recent rains have improved the pasturage. The value of all stock has not varied. One case of Lungsickness and one of Quarter evil appeared during the month. During the month rain fell very copiously. The Natives are ploughing, and there is every prospect of there being an excellent season should the rains continue.

Xalanga.—Pasturage good and all stock in good condition. No disease reported during the month. 2¼ inches rain fell in the earlier part of the month. The wheat crops are very promising. The forage crop will be a large one and of excellent quality. Potatoes are doing well. Fruit crop prospects are fair, with the exception of peaches. Peach trees are suffering severely from Aphis; some of the trees have been quite denuded of their leaves.

NOTES ON THE WEATHER OF OCTOBER, 1905.

BY CHARLES M. STEWART, B.SC., Secretary to the Meteorological Commission.

Mean barometric pressure slightly lower than usual, mean temperature about one and a half degrees colder than the average, few frosts, a marked decrease in the number of thunderstorms as compared with the previous month, a cloudiness above the average, practically daily fogs or mists, a depth of rainfall almost one-half greater than the normal, some showers of snow and sleet, and several gales were the most notable features of the weather of October last.

Precipitation.—The mean rainfall for October, deduced from the records of 346 gauges, was 2 81 ins. falling on 5 days. Although this is a decrease of 1·03 in. as compared with last month, it is nevertheless an excess of 0·91 in , or 48 per cent. over the normal for the month. The accompanying table shews that the excess was mainly due to the exceptionally heavy precipitation over the South-East and South coast divisions, a state of affairs which was also experienced over the Southern, East, and West Central Karoos. and also affected, but in a less degree, the South-West, West Coast, and Kaffraria. Over the Northern Karoo and the Cape Peninsula the rainfall was only slightly less than the average. Over the remaining parts of the Cape Colony and the adjacent Colonies, the mean rainfall was mostly between 80 and 90 per cent. less than the normal, causing a partial drought. Broadly speaking, therefore, it may be said that copious rains fell over the Southern half of the Cape Colony whilst the northern half was subjected to drought throughout the month. A scrutiny of the totals for each of the stations shews that rainfall during October was fairly general over the country, only 15 of the 346 stations reporting *nil* for the month, and 93 having one inch or less (1·00 to 0·01 ins.), being about 31 per cent. of the total number of stations. Of the remaining 228 stations, 71 had between 1 and 2 ins.; 51 from 2 to 3 ins.; 31 from 3 to 4 ins.; 22 from 4 to 5 ins.; 17 from 5 to 6 ins.; 23 from 6 to 8 ins.; 14 from

Division.	Mean Rainfall (1905).	Mean No. of Days.	Average Rainfall (1894-1903).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ..	3·32	12	3·47	9	— 0·15	— 4
South-West ..	3 14	8	1·98	6	+ 1·16	+ 59
West Coast ..	·92	5	·83	4	,, 0·09	,, 11
South Coast ..	4·39	8	2 33	8	,, 2·06	,, 88
Southern Karoo ..	1·84	4	·95	3	,, 0·89	,, 94
West Central Karoo ..	1·79	3	·62	2	,, 1·17	,, 189
East Central Karoo ..	2·36	3	·85	3	,, 1·51	,, 178
Northern Karoo ..	74	2	·77	2	— 0 03	— 4
Northern Border ..	·13	1	·69	2	— 0·56	— 81
South-East ..	6 50	6	2 37	7	+ 4·13	+ 174
North-East ..	·83	3	1·45	4	— 0·62	— 43
Kaffraria	2 96	6	2 33	7	+ 0·63	+ 27
Basutoland ..	·36	3	2 34	6	— 1·98	— 85
Orange River Colony ..	·24	2	1·42	3	,, 1·18	,, 83
Durban (Natal) ..	3·57	11	4·16	..	,, 0 59	,, 17
Bechuanaland ..	·10	1	1·24	3	,, 1 14	,, 92
Rhodesia	09	1	·72	4	,, 63	,, 88

8 to 10 ins.; quantities over 10 ins. were recorded at 9 stations, eight being in the South-East Division and one (Kentani) in Kaffraria. The seven stations at which upwards of 11 ins. were registered were Thaba 'Nchu with 11·62 ins.; Kei Road with 11·64 ins.; East London East with 11·71 ins.; Fort Jackson with 11·85 ins.; Kentani with 11 89 ins.; and Forestbourne with 14·73 ins.; while the maximum of 17·95 ins. was registered at Evelyn Valley. A similar examination of the maximum rainfall in 24 hours shews that some exceptionally heavy falls were experienced over a goodly portion of the country, particularly over the South-East where altogether seven stations recorded a total of 8 to 11 ins. on one day the 10th. The three greatest amounts registered on that day were 11·38 ins. at Evelyn Valley, 10·18 ins. at Forestbourne and 9·05 ins. at East London (East). So great was the rush of water in the Buffalo River brought about by this freshet, that on the morning of the 11th it was found that various hulks and small craft had been washed over the 'Bar' at East London, whilst the 'Bar' itself had been washed away leaving the entrance to the harbour deeper than had ever been known before. Of the remaining 337 stations furnishing particulars of the daily amounts, 159 had maxima of one inch or less (excluding the 15 with "Nil"); 93 had 1 to 2 ins.; 26 had 2 to 3 ins.; 15 had 3 to 4 ins.; 12 had 4 to 5 ins.; 5 had 5 to 6 ins., and an equal number 6 to 7 ins.; 3 had 7 to 9 ins., and 4 had 8 to 9 ins. *Thunderstorms* were reported from altogether 86 stations on 16 days of the month, most widely on the 10th, 6th, 31st and 24th. *Hail* fell at 13 stations on 5 days, particularly 9th to 11th. *Snow* was reported from 12 stations on the three days mentioned, but seems to have fallen most abundantly at Roode Hoogte where it was stated to have covered the ground to a depth of 3 inches, while the ground was white at Sterkstroom, Steynsburg, and Glen Wallace. *Sleet* also occurred at 3 stations on the 10th and 11th.

Temperature, Cloud and Wind.—The temperature curve is still ascending, the mean for the month being 61 9° or 3·5° warmer than during September. The mean is 1·3° lower however than the average, the mean maximum (73 4°) being 2·1°, and the the mean minimum 0·4° less than the normal, causing the mean daily range (23·0°) to be 1·7° less than usual. Over the South and West the mean monthly temperature was mostly below the average by about half-a-degree rising to about two degrees at Ceres, but was mostly 2 to 4 degrees above the average in the North and East. Over the South and West and along the South-East the day temperatures were 1 to 2 degrees lower than usual, and the night temperatures about normal; inland, however, the mean maxima and minima were mostly above the average, the excess in the day temperatures being about twice that of the night temperatures. Thus, at Hope Fountain in Rhodesia the mean maximum was 5·7° and the mean minimum 2·7° higher than usual. The warmest station during last month was Hope Fountain with a mean of 74·5°, and the coolest the Devil's Peak (Cape Peninsula) with 55·9°, a difference of 18·6°. The highest mean maximum was 89·1° at Hope Fountain, and the lowest mean minimum was 41·2° at Hanover. The warmest days of the month were most generally from 13th to 15th, 22nd and 31st, while the coldest mornings were commonly those of 1st, 2nd, and 9th—11th. The mean value of the absolute maxima was 90·5° and of the absolute minima 38·8°, giving a mean monthly range of 51·7°. Compared with September the mean of the highest temperatures was 6·3°, and of the lowest temperatures 3 4° higher than in that month, shewing an increase of 2·9° in the mean monthly range. The absolute maximum recorded last month was 116·5° at Main during a strong hot N.W. wind on the 19th, and the absolute minimum 26·0° at Bensonvale on the 11th, an extreme range during the month of 90·5°. Main was the only station shewing a temperature exceeding 100°, Kimberley coming next with 99·9°, while temperatures exceeding 90° were common to 28 other stations. *Frosts* were reported from altogether 11 stations and occurred on the 1st, 2nd, 11th, 12th, and 13th, those on the 12th being severe enough to kill fruit and pumpkins at Boschfontein and potatoes at Schuilhoek.

The mean cloudiness of sky during the month was 49 per cent., being 6·6 per cent. more than the average, and 4 per cent. less than in the previous month. The mean proportion of sky obscured was mostly between 60 and 70 per cent. along the coast belt, 40 and 50 per cent. for a short distance inland, and most, 35 to 40 per cent., in the interior, decreasing, however, to 19 and 20 per cent. at Kenhardt and Kuruman respectively. The mean amount of cloud varied from 75 per cent. at Disa Head (Table Mountain) to 14 per cent. at Hope Fountain, near Bulawayo. *Fogs* or *Mists* mostly local were reported from 99 stations on 29 days of the month, the two exceptional days being the 1st and 31st. They were most numerously reported from 8th to 10th, and 22nd to 25th, and on the 28th. Over the South-west portions of the country the winds were almost equally divided between North westerly and Southerly, with a slight excess of North-westerly above the average; along the coasts they were almost equally distributed between East and West, and chiefly North-easterly or South-easterly in the interior, with frequent calms. The mean force of the wind on the Beaufort scale of (0—12) was 2·34, corresponding to a mean velocity of 14·7 miles per hour, or 1·2 miles per hour greater than during the preceding month. The wind was reported to have attained the force of a gale on 12 days of the month, most widely on the 19th, when a Westerly gale prevailed all along the coasts, and for a considerable distance inland causing considerable damage to fruit trees, oaks, etc., unroofing some houses at Piquetberg and overthrowing telegraph poles. At Sea Point the maximum velocity was 42 miles per hour between 7.30 and 8.30 a.m., decreasing to 37 miles during the next hour. This gale was felt as far inland as Queenstown and Amalienstein, and Wagenaar's Kraal, and caused the excessively high temperature of 116·5° at Main, where it assumed the character of a Berg wind. The gale of the 9th also caused considerable damage to vines, &c , in the South-West. Hot winds were reported on six days from 7 stations, and duststorms from 9 stations on 3rd, 15th, and 19th, mostly on the last dates.

OBSERVERS' NOTES.

Groot Drakenstein.—Temperature normal, though very erratic. Rainfall 1·25 in. above average (3·11). A disastrous month for fruit and wine farmers owing to gales. The gale from the S.E. on the 6th was the worst experience in 7 years. Unusual features were: a low glass, overcast sky and slight rain and heavy snowfall on mountains. Great damage done to vineyards and fruit crop. On the 16th and 17th further damage was done from N.W. and again in the N.W. gale on the 19th. Oak trees were badly smashed and some farms report the loss of a quarter of their grape crop. The force of the wind was greater on the 9th, but the heavy rain accompanying it on the 19th was probably the cause of more damage being done to trees.

Kokstad (The Willows).—Hot winds, very little rain ; ground parched with great heat. Rain badly needed. Fruit in town promises well, also in these parts of the country untouched by frost. Whooping cough and measles rather prevalent. Stock looks well, but veld very dry.

Boschfontein.—Several frosts occurred, one very sharp on the 12th, killing fruit, pumpkins, etc. Prevailing winds—westerly. Furious gale on 19th from N.W. A few small swarms of locusts hatched out towards end of month. Springs weakening seriously and rain badly wanted.

Van Wyk's Vlei.—Crops ripening—yield expected to be below average. Flocks trekking in search of water and pasturage.

Alexandria.—Crops very promising.

Carnarvon Farm.—Only three frosts this month, being a record for 5 years. Windy days, 12 (about the average) ; cloudless days, 4—usually we only get 1 or 2 this month.

Thibet Park.—Very high winds and very hot during last half of month.

Kokstad. —Weather very sultry during month. Veld drying up for want of rain.

TEMPERATURE, OCTOBER, 1905.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory	67·5	52·6	60·0	86·8	31	45·5	1
Devil's Peak	63·1	48·7	55·9	90·0	31	41·0	9
Groot Constantia	65·7	51·8	58·8	88·0	31	42·0	18
Wynberg	68·2	51·9	60·1	82·0	31	45·5	1
Blaauwberg	66·0	52·9	58·9	75·5	30	48·5	11
S.A. College	69·1	50·4	59·8	92·0	31	42·5	2
Simon's Town	68·3	54·7	61·5	82 3	31	47·1	9
Sea Point	67 3	52·2	59·8	77·5	14	46·5	13
Elsenburg Agricult'l College	68·7	47·0	57·8	92·8	31	34·2	11
Robertson Plantation	74·5	53·2	63·8	91 0	31	42·0	10
Ceres	67·6	47·0	57 3	82·0	22	34·0	11
Groot Drakenstein	71·5	50·8	61·2	95·8	31	42·1	2
Abbotsdale	71·2	48·7	60·0	93·0	31	39·0	12
O'okiep	74·3	49·0	61 7	92·0	22	35·1	10
Dunbrody	76·8	50·1	63·4	89·8	14	35 2	1
Concordia Plantation	63·2	51·8	57·5	81·0	13	45·0	12
George	66·5	50·7	58·6	81·0	14	42·0	1
Cape L'Agulhas	64 6	54·6	59·6	71·0	28	49·0	1 & 11
Van Staaden's River	69·5	50·6	60·0	90 0	15	38·0	1
Storm's River	69·4	50·3	59 8	92 5	14	41·5	28
Heidelberg	77·3	52·7	65·0	91·0	31	40·0	1
Uitenhage	76·9	51·6	64·2	86·0	13	38·0	1
Port Elizabeth	69·0	55·7	62·4	94·0	14	46·0	1
Cape St. Francis	66·4	54·5	60·4	93·0	14	47 0	1
Amalienstein	77·1	48·7	62·9	98·0	31	41·0	13
Rust en Vrede	70 6	48·1	59·4	99·0	31	33·0	12
Murraysburg	75·9	44 9	60·4	88·0	31	33 0	1
Hanover	76·2	41·2	58 7	89·0	22	29·0	1 & 12
Hope Town	83 0	48·7	65·9	94·8	22	36·0	1
Kimberley	87 9	51·5	69 7	99 9	22	38 6	11
Kenhardt	84 8	50·3	67 6	99·0	22	38·0	2
Bedford	72·7	48·8	60·8	88·0	15 & 20	33·0	1
Sydney's Hope	70 1	49·7	59 9	86·0	31	40·0	1
East London	69·2	56·9	63·0	91·0	16	42·0	1
Stutterheim	71·4	50·6	61·0	89 5	15	36·0	1
King William's Town	75·8	52·7	64·2	97·0	15	44·0	1
Evelyn Valley	67·7	47·1	57·4	85·0	15	31·0	1
Queenstown	79 0	50 1	64 6	93 0	27 & 31	31·0	1
Rietfontein (A. North)	75 8	44 5	60·2	85·6	31	29·2	1
Bensonvale Institute	76·6	41·6	59·1	83·0	22	26·0	11
Kokstad (The Willows)	76·1	47 0	61·5	90·5	15	33·0	1
Port St. John's	74·5	57·7	66·1	99·0	20	45·0	2
Mount Ayliff	78·5	52·7	65·6	95·0	15	39 0	12
Main	76·4	49·8	63·2	116·5	19	33·5	1
Matatiele	80·5	48·4	64 4	92 0	22	34·0	1
Umtata	76·2	51 2	63·7	96·0	15	40·0	3
Leribe	80·3	48 5	64·4	96·6	7	33·0	10
Mohalie's Hoek	78·3	45·7	62·0	88 0	28	30·0	1
Kuruman	84·3	50·6	67·5	97·0	23	36·0	11 & 13
Hope Fountain	89·1	59 9	74·5	97·5	27	49·8	14
Means	73·4	50·4	61·9	90·5	..	38·8	..
Extremes	..	..	..	116·5	19th	26·0	11th

RAINFALL, OCTOBER, 1905.

I. CAPE PENINSULA:

	INCHES
Royal Observatory, (*a*) 12 inch gauge	1·42
Cape Town, Fire Station	1·67
Do South African College	2·41
Do Sea Point (Hall)	1·35
Do do (Attridge)	1·81
Do Molteno Reservoir	1·99
Do Platteklip	2·9[illegible]
Do Signal Hill	1·19
Table Mountain, Disa Head	2·75
Do Kasteel's Poort	5·20
Do Waai Kopje	6·02
Do St. Michael's	6·25
Devil's Peak, Block House	4·28
Do Nursery Gauge	4·08
Do Lower Gauge	3·58
Kenilworth	6·22
Wynberg (St. Mary's)	5·12
Groot Constantia	5·51
Tokai	3·47
Simon's Town (Wood)	5·46
Do. (Gaol)	5·09
Blaauwberg Strand	1·18
Robben Island	0·92
Camp's Bay	2·31
Fish Hoek	2·36
Cape Point	2·16
Woodstock	2·53
Woodstock (Quarry)	3·55
Plumstead (Culmwood)	3·55

II. SOUTH-WEST:

Eerste River	1·98
Klapmuts	3·48
Stellenbosch (Gaol)	2·77
Paarl	4·66
Wellington (Gaol)	2·14
Groot Drakenstein	4·36
Tulbagh	2·19
Kluitjes Kraal	3·63
Ceres	6·78
Do Road	3·24
Caledon	4·15
Worcester (Gaol)	1·29
Do (Station)	1·47
Hex River	1·65
Lady Grey (Afd. Robertson)	1·02
Robertson	1·21
De Doorns	0·95
Rawsonville	4·56
Robertson (Govt. Plantation)	1·27
Porterville Road	2·13
The Oaks	1·81
Danger Point	3·89
Vijgeboom's River	8·75
Elgin Plantation	7·82
Elsenburg Agricultural College	2·78
Roskeen	2·75
Vruchtbaar	3·28

III. WEST COAST:

	INCHES
Klipfontein	0·85
Kraaifontein	0·80
O'okiep	0·36
Springbokfontein (Gaol)	0·40
Concordia (Krapohl)	0·24
Garies	0·06
Kersefontein	1·80
The Towers	1·27
Dassen Island	0·61
Malmesbury	2·21
Piquetberg	2·70
Van Rhynsdorp	0·22
Clanwilliam (Gaol)	0·58
Lilyfontein	0·66
Zoutpan	1·13
Wupperthal	1·84

IV. SOUTH COAST:

Cape L'Agulhas	1·77
Bredasdorp	2·61
Swellendam	2·81
Heidelberg	2·17
Riversdale	1·56
Geelbek's Vlei	3·85
Mossel Bay	2·94
George	9·14
Millwood	5·85
Sour Flats	4·96
Concordia	5·80
Knysna	5·19
Buffels Nek	7·60
Plettenberg Bay	3·25
Blaauwkrantz	8·28
Cape St. Francis	2·04
Zuurbraak	3·19
Vogelvlei	4·43
Great Brak River	3·51
Witteklip	5·47
Van Staaden's (upper)	6·22
Do (Lower)	5·00
Uitenhage	3·35
Do (Inggs)	3·28
Port Elizabeth (Harbour)	2·43
Lottering	5·23
Shark's River (Nursery)	3·08
Do (Convict Station)	2·90
Grootvader's Bosch	3·92
Karnmelk's River	2·72
Kruis River	3·35
Armadale	4·58
Centlivres	3·33
Woodfield	6·73
George (Plantation)	7·04

V. SOUTHERN KAROO:

Verkeerde Vlei	1·05
Touws River	0·62

V. S. KARROO—*continued*

	INCHES
Ladismith	2 15
Amalienstein	2·39
Calitzdorp	2 40
Oudtshoorn,	1·97
Uniondale	1 90
Kleinpoort	2·87
Bok River	1 81
Triangle	0·75
Pietermeintjes	1·62
Grootfontein	0·98
Rust en Vrede	3·34

VI. WEST CENTRAL KARROO:

Matjesfontein	0·93
Fraserburg Road	1·00
Prince Albert	0·89
Zwartberg Pass	5·52
Beaufort West	2·00
Nel's Poort	3·00
Camfer's Kraal	1·56
Willowmore	1·51
Steytlerville	1·83
Laingsburg	0·64
Krom River	1·15

VII. EAST CENTRAL KAROO:

Aberdeen (Gaol)	2 04
Do (Bedford)	2·26
Rietfontein	1·41
Winterhoek	5·25
Kendrew	2·24
Graaff-Reinet	2·45
Do (Eng. Yard)	2·33
New Bethesda	2·30
Roode Bloem	1·42
Glen Harry	1·24
Bloemhof	1·67
Jansenville	1·88
Patrysfontein	1·55
Toegedacht	1·40
Klipfontein	1·63
Cranemere	1·50
Pearston	1 96
Somerset East	7 59
Corndale, Div. Aberdeen	4·07
Middlewater	2·34
Roode Hoogte	0·55
Walsingham	2·04
Arundale	2·78
Spitzkop (Graaff Reinet)	2·15

VIII. NORTHERN KAROO:

Calvinia	0·44
Sutherland	1·39
Fraserburg	0·72
Droogefontein	0·78
Carnarvon	0·23
Wagenaar's Kraal	1·32
Brakfontein	2·10
Victoria West	0·92
Britstown	0·00
Murraysburg	0·51
De Kruis	0 96
Richmond	1·11

VIII. N. KAROO—*continued*

	INCHES
Middlemount	0·35
Hanover	0·25
Philip's Town	0·07
Boschfontein	0 33
Petrusville	0·00
The Willows	1·10
Middleburg	0·77
Colesberg	0 10
Cradock	0·90
Do (Eng. Yard)	1·00
Steynsburg	0 69
Tarkastad	1·02
Riet Vlei	0 67
Varken's Kop	0·92
Culmstock	1·30
Doorskuilen	0 00
Hillmoor	0·37
Loxton	1·08
Waverley	2·03
Maraisburg	1·41
Schuilhoek	0·39
Vosburg	0·08
Zwavelfontein	0·19

IX. NORTHERN BORDER:

Kenhardt	0·10
Van Wyk's Vlei	0·20
Prieska	0·26
Dunmurry	0 09
Griqua Town	0 54
Campbell	0·00
Douglas	0·00
Avoca (Herbert)	0·17
Hopetown	0 38
Newlands (Div. Barkly West)	0 00
Kimberley (Gaol)	0·02
Do (Stephens)	0 04
Bellsbank (Div. Barkly West)	0·00
Barkly West	0·03
Upington	0·18
Trooilapspan	0·00
New Year's Kraal	0·27
Karree Kloof	0 00

X. SOUTH-EAST:

Melrose	1·97
Fairholt	3·30
Cheviot Fells (Bedford)	1·27
Bedford (Gaol)	4 66
Sydney's Hope	4 52
Cullendale	3·93
Adelaide	3·54
Atherstone	5·38
Alexandria	3·85
Graham's Town (Gaol)	7·04
Heatherton Towers (near Graham's Town	3 38
Fort Beaufort	4 52
Katberg	6 39
Seymour	3·54
Glencairn	3 79
Port Alfred	5 79
Hogsback	5·19
Thaba N'doda	11·62
Peddie	6 97

X SOUTH-EAST—*continued*

	INCHES
Cathcart	1 78
Keiskama Hoek	8 21
Thomas River	2 45
King William's Town	7 53
Do Hospital	8·71
Stutterheim (Besté)	6·88
Daggaboer	8 02
Lynedoch	2·79
Crawley	1·20
Kubusie	7·14
Blaney	2·30
Evelyn Valley	17·95
Isidenge	7·94
Perie Forest	7·69
Quacu Fores	5·18
Kologha	8·05
Komgha	9·70
Prospect Farm (Div. Komgha)	9 69
East London, West	6·53
Fort Cunynghame	8·47
Bolo	8·52
Fort Fordyce	6 44
Forestbourne	14·73
Chiselhurst	10·27
Wolf Ridge	9·88
Dontsah	8·92
Mount Coke	6·75
Blackwoods	4·90
Albertvale	3·68
Cathcart Plantation	2·82

XI. NORTH-EAST.

Venterstad	0 27
Ellesmere	0 29
Molteno Station	0·39
Thibet Park	0·55
Sterkstroom	1·47
Rocklands	1·71
Aliwal North (Gaol)	0·16
Do (Brown)	0·19
Rietfontein	0 35
Carnarvon Farm	1·29
Jamestown	0 26
Queenstown (Gaol)	0·94
Do (Beswick)	1·80
Herschel	0·57
Lady Grey	0·63
Bolotowa, Contest	1·76
Lady Frere	1·61
Keilands	1·86
Barkly East	0 94
Lyndene	0·00
Mooifontein	0·55
Poplar Grove	1·30
Whittlesea	0·48
Halseton	1·43
Sterkspruit	0·37
Blikana	0 60
Table Hill	1·00
Albert Junction	0 00
Hughenden	0·40
Glen Wallace	1·82
Bensonvale Inst.	0·64

XII. KAFFRARIA:

	INCHES
Slaate, Xalanga	1 94
Ida, Xalanga	1·51
Cofimvaba	2·14
Nqamakwe	4·52
Main	1·43
Engcobo	2·78
Butterworth	4·96
Kentani	11·89
Maclear	1·06
Idutywa	2·02
Mount Fletcher	0·45
Elliotdale	6·52
Mqanduli	4·70
Matatiele	0·29
Umtata	2·68
Kokstad	0·40
Port St. John's	9·10
Umzimkulu	0·00
Tabankulu	1·55
Somerville (Div. Tsolo)	1·59
Tsomo	2·65
Bazeya	4·86
Cwebe	9·17
Mount Ayliff	1·22
Seteba	0·37
Flagstaff	3·44
Insikeni	1·50
Cedarville	0·39
Kokstad (The Willows)	0·61

XIII. BASUTOLAND:

Mafeteng	0·15
Mohalie's Hoek	0·14
Qacha's Nek	0·24
Moyeni Quthing	0 60
Leribe	0·64
Maseru	0·41

XIV. ORANGE RIVER COLONY:

Kroonstad	0·13
Imperani	0·36

XV. NATAL.

Durban, Observatory	3·87

XVII. BECHUANALAND:

Vryburg	0·00
Taungs	0·18
Setlagoli	0·02
Kuruman	0·31
Zwartlaagte	0·00

XVIII. RHODESIA:

Hope Fountain	0·04
Fort Bixon	0·28
Matopo Park	0·00

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 25th November, 1905, ruling at the several centres named, is published for general information :—

CENTRE.	A. Wheat per 100 lb.	B. Wheat Flour per 100 lb.	C. Boer Meal per 100 lb.	D. Mealies per 100 lb.	E. Mealie Meal per 100 lb.	F. Barley per 100 lb.	G. Oats per 100 lb.	H. Oat-hay per 100 lb.	J. Potatoes per 100 lbs.	K. Tobacco (Boer Rol) per lb.	L. Beef per lb	M. Mutton per lb.	N. Fresh Butter per lb.	O. Eggs per doz	P. Cattle (Slaughter.)	Q. Sheep (Slaughter.)
	£ s d.	£ s. d.	£ s. d	£ s d.	£ s. d	s. d.	s. d.	£ s. d	£ s. d.	£ s. d.	s d	s d	£ s. d.	s. d.		
Aliwal North ...	0 12 0	0 18 6	0 13 6	0 6 0	0 8 6	10 0	9 0	0 8 0	0 8 6	1/6 to 4/-	7½d to 8½d	4½d to 8½d	1/6 to 2/3	1/- to 1/6	£12	23/-
Beaufort West .	0 12 0	0 17 6	0 12 9	0 7 9	0 11 0	10 0	9 0	0 6 6	0 12 0	0 0 8	*6d to 1s †5d to 10d	*7d to 8d †5d to 6d	0 1 6	1 3	£18	25/-
Burghersdorp ...	...	...	...	...	...	...	...	0 6 0	0 12 6	...	...	*0 7½	0 1 9	1 3	...	...
Cape Town ...	0 9 3	0 13 3	0 10 3	0 7 0	0 8 0	8 0	7 4	3/9 to 4/-	0 9 8	0 0 8	0 9	0 7½	1/2 to 1/3	1 3	£16 to £20	25/-
Clanwilliam ...	0 11 0	...	0 12 3	0 12 0	...	10 0	9 0	...	0 8 0	0 1 0	*0 8	*0 8	0 1 4	0 9	£14	20,-
Colesberg ...	...	...	...	.	...	...	...	0 6 6	1 0 0	...	...	*0 7	0 1 6	1 3	...	...
Cradock ..	..	...	0 10 0	. .	...	6 0	...	0 4 2	0 14 6	0 0 6	...	0 7	0 1 2	1 9	...	...
Dordrecht ...	0 10 6	0 13 6	0 13 0	0 7 3	0 9 0	9 6	8 6	0 8 0	0 15 0	0 1 0	0 9	0 8½	0 0 10	1 6	£12	20/-
East London ...	0 13 0	0 13 6	0 12 6	0 6 6	0 10 6	8 0	8 0	0 4 9	0 16 0	0 1 6	†6d & *7d	†6d & *7d	0 1 6	1 6	£21	36/-
Graaff-Reinet ...	0 10 0	..	...	0 5 6	...	8 0	8 0	0 4 0	1 0 0	0 0 6	...	...	0 1 3	1 3	£11	20/-
Graham's Town	. .	...	...	0 8 0	...	5 0	...	0 4 0	0 18 6	...	0 7½	0 7¾	0 1 4	1 3½	...	...
Kimberley ...	0 11 0	0 15 0	0 14 0	0 6 6	0 6 6	9 0	9 0	0 5 3	1 0 0	0 0 7	*0 10	*0 8	0 1 6	1 3	£14 to £16	20/- to 25/-
King Wm's Town	0 10 0	0 15 0	0 12 0	0 9 0	0 9 6	6 0	8 0	0 2 6	0 12 0	0 0 6	*0 6	*0 6	0 1 6	1 3	£16	25/-
Malmesbury ...	0 10 6	0 14 6	0 12 0	0 8 0	...	8 0	7 6	0 3 3	0 8 4	0 1 0	*†0 8	*†0 8	0 1 3	1 3	£16	24/-
Mossel Bay ...	0 10 0	0 16 0	0 18 0	0 16 0	...	4 0	10 0	0 7 6	0 18 0	0 1 0	*9d & †8d	*9d & †8d	0 1 6	1/6 to 2/-	...	...
Port Alfred ...	0 12 0	0 19 0	0 15 0	0 9 0	0 12 0	5 0	7 6	0 2 6	0 12 0	0 0 8	*0 8	*0 9	0 1 3	1 1	...	...
Port Elizabeth ...	...	...	...	0 7 6	...	4 3	...	0 2 6	0 19 6	...	0 7	0 8	0 1 6	1 6	...	...
Queen's Town ...	0 6 0	0 12 6	0 5 9	0 5 0	0 5 0	5 3	5 3	0 2 9	0 11 6	0 1 6	*0 6	*0 7	0 1 3	1 3	£12 to £15	20/- to 23/-
Tarkastad ..	0 13 6	0 15 0	0 13 6	0 8 6	0 12 0	10 0	...	0 6 0	1 0 0	0 1 0	*†0 7	*†0 7	0 1 3	1 3	£15	22/-
Vryburg ...	0 11 0	0 18 0	0 14 0	0 6 0	0 8 6	11 3	10 0	0 7 6	22/6 to 25/-	0 0 6	*0 10	*0 9	0 1 9	0 10	£13 10s.	[illegible]
Worcester ...	0 10 0	0 14 6	0 10 6	0 7 6	0 8 6	7 6	8 0	0 3 0	0 11 0	0 0 6	*8d & †7d	*7d & †6d	0 1 4	1 0	...	...

NOTE.—A blank space denotes "no transactions." * Colonial. † Frozen.

DEPARTMENTAL NOTICES.

Application for the Services of Government Veterinary Surgeons.

It is hereby notified that as there are now several qualified Veterinary Surgeons in private practice in Cape Town and its vicinity, Kimberley, and Port Elizabeth, the services of Government Veterinary Surgeons in these places will be available only in cases where an animal is suffering from a contagious or infectious disorder, or in cases which are, on other grounds, of public interest and importance.

Farmers and owners of stock throughout the Colony frequently telegraph for one of the Government Veterinary Surgeons to be sent to attend to some valuable animal which has been taken seriously ill. It is rarely possible to comply with these requests at once; in the first place, because it is seldom that the Veterinary Officers can be communicated with immediately by telegraph, as they are generally engaged in the country at some distance from a telegraph station, and in the second place, because the only Veterinary Officer who may be at liberty to leave the work upon which he is engaged at the time may be at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any real service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the Veterinary Staff discredited. It would be much more satisfactory therefore in all cases in which veterinary advice and assistance are required, if the owner would telegraph to "Veterinus," Cape Town, with prepaid reply the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible This-would enable the Chief Veterinary Surgeon to telegraph advice at once, and state whether he were able to arrange for veterinary attendance on the case or not, and thereby save valuable time, which is always of importance in acute and urgent cases.

It must, however, be clearly understood that, as this arrangement is intended purely for the benefit of farmers, the Government cannot accept any responsibility whatever, pecuniary or otherwise, for any loss of stock, etc., which may result from the treatment or advice of any Government Veterinary Surgeon.

Applicants for the services of the Government Veterinary Surgeons must, at their own cost, provide the necessary transport for the conveyance of these Officers from and back to their residences or nearest Railway or Post Cart Station.

D. Hutcheon,
Chief Veterinary Surgeon.

Veterinary Branch,
Department of Agriculture, 24th September, 1905.

List of Cape Government Veterinary Surgeons.

Stations.	Names.
Beaufort West	Mr. S. Elley, M.R.C.V.S.
Cape Town	Mr. J. H. L: Lyons, M.R.C.V.S.
Cape Town	Mr C. Goundry, M.R.C.V.S.
East London	Mr. R. W. Dixon, M.R.C.V.S.
Elsenberg (Mulder's Vlei)	Mr. R. Paine, M.R.C.V.S.
Grahamstown	Mr. T. Bowhill, F.R.C.V.S.
Grahamstown	Mr. J. Spreull, M.R.C.V.S.
Kokstad	Mr. M. A. Hutchence, M.R.C.V.S.
Mossel Bay	Mr. J. A. Robinson, M.R.C.V.S.
Molteno	Mr. W. G. Pakeman, M.R.C.V.S.
Somerset East	Mr. J. D. Borthwick, M.R.C.V.S.
Uitenhage	Mr. G. W. Freer, M.R.C.V.S.
Umtata	Mr. P. X. Kearney, M.R.C.V.S.
Vi	Mr. J. Neill, M.R.C.V.S.
W	Mr. A. Goodall, M.R.C.V.S.

Free Carriage of Cattle and Ostrich Dips.

It is hereby notified for general information that the undermentioned Cattle and Ostrich Dips will be carried free to purchasers thereof on the Cape Government Railways and by road, subject to the conditions specified in the subjoined Schedule.

D. HUTCHEON,
Acting Director of Agriculture.

SCHEDULE OF CONDITIONS.

1. The Dip must be carried from the nearest Railway Station or Port, as the case may be, or otherwise by the usual trade route serving the locality in which the purchaser resides.

2. The Railage and road carriage, the cost of which will be borne by the Government, will be for the *forward* journey only, *i.e.*, from the nearest Railway Station or Port, or the usual trade route, as the case may be, to the purchaser's farm. No cost of the *return* journey or any part of it will be borne by the Government.

3. On delivery to the Civil Commissioner of the Division of the Railway consignment note or the receipt for transport, or both, and on presentation to him of the seller's invoice or receipt for any of the undermentioned Dips, a refund will be made to the consignee of the railway or transport charges, or both, paid by him.

4. The Railway charges to be refunded will be at the third-class rate.

5. The transport charges shall not exceed those usually made to the general public.

6. The following Cattle and Ostrich Dips have been accepted as effective Tick-destroying preparations for the purpose, and within the meaning of these Regulations, and no other Dip will be recognised as an effective Tick-destroying preparation until a sample is supplied for analysis and a test of its practical efficacy has been made in the presence and to the satisfaction of a Government Veterinary Surgeon, viz.:—

Alderson's Cattle Dip.
Cooper's Cattle Tick Dip.
Demuth's Cattle Dip.
Fletcher's Albany Tick Dip.
Hayward's "Fluid" Dip and Cattle Wash.
Little's Cattle Tick Dip.
Quibell's Paste Cattle Dip.

Warning.—Poisonous Plants in Oathay.

It having been brought to the notice of the Agricultural Department, and established beyond doubt, that several valuable horses—more recently in the district of Kimberley—have died from eating the plant "Ornithogalum Thyrsoides," locally known as "Chincherinchee" or "Violjee," which was found mixed in bales of Forage coming from the Western Districts of the Colony, the Public are reminded of the fact that the plant in question is of a very poisonous nature.

Both Forage Growers and Forage Dealers would therefore be well advised to carefully consider the danger to which they are exposed by reason of this poisonous weed being left in the forage sold, and the liability of the seller for any damage which may result therefrom when fed to animals.

D. HUTCHEON,
Chief Veterinary Surgeon.

Introduction of Swine into Transvaal and Orange River Colony.

It is hereby notified for the information of the public that, in order to comply with the regulations published by this Department's Notices Nos. 6 and 7, dated 10th July, 1905, governing the introduction of Swine into the Transvaal and the Orange River Colony respectively, it will be necessary for owners of pigs to have the certificate referred to therein first signed by a Resident Magistrate, Field-cornet Justice of the Peace, or duly qualified Veterinary Surgeon, before submitting it to this Office for counter-signature

D. HUTCHEON,
Chief Veterinary Surgeon.

Ports of Entry for Live Stock from the Transvaal.

The following proclamation, No. 325 of 1905, is issued by HIS Excellency the Governor:—

Whereas it has been shewn to me to be expedient to restrict the introduction of Livestock, the importation of which into this Colony from the Transvaal is now or may hereafter be regulated, to certain defined Ports of Entry on the Cape Colony—Transvaal Border:

Now, therefore, under and by virtue of the powers and authorities in me vested by the 6th Section of the Animal Diseases Act No. 27 of 1893, I do hereby proclaim, declare and make known that, from and after the date of the publication hereof, the introduction of Livestock into this Colony from the Transvaal, the importation of which is now or may hereafter be regulated and controlled, shall be permitted only through the Ports of Entry established at Malmani Road, Myssymiyani and Fourteen Streams, on the Cape Colony—Transvaal Border.

Ports of Entry into Orange River Colony.

The subjoined further amended list of Ports of Entry for Livestock from the Cape Colony into the Orange River Colony, together with the conditions imposed by that Colony, is hereby published for general information, and will replace my notice No. 8, dated 13th July, 1905.

D. HUTCHEON,
Chief Veterinary Surgeon.

Office of the
Chief Veterinary Surgeon,
Cape Town, 7th September, 1905.

Ports of Entry for Live Stock.

1. Frere Road Bridge.
2. Bethulie Road and Railway Bridges.
3. Norval's Pont Railway Bridge.
4. Colesberg Road Bridge.
5. [illegible] Pont on the farm Weigedraai, Division of Fauresmith.
6. The farms Ramah } in the Division of Jacobsdal.
7. [illegible], }
[illegible].
[illegible] farm Rosebery Plain (Welgevonden), for the Division of Kimberley.
[illegible] farm Rietpan. }
11. The farm Charlottendal and } for the Division of Boshof.
12. [illegible] Rust, }

REGULATIONS.

1. Orange River Colony Ordinance No. 52, of 1903, and Proclamation No. 3, of 1904, prohibit the introduction of any horse, gelding, mare, colt, filly, donkey, mule, bull, ox, cow, heifer, calf, or ostrich into the Orange River Colony, unless the owner shall have first obtained a certificate as hereunder set forth.

2. The certificate necessary before any of the above-mentioned animals can be permitted to enter the Orange River Colony is that set forth in Annexure "A" hereto. issued and signed by the Resident Magistrate, Justice of the Peace, Field-Cornet, Veterinary Officer or Inspector of Sheep of the District in the Cape Colony from which such animals have come.

3. The person in charge of such animals is liable to be called upon to produce the certificate aforesaid to the Inspector of Stock at any of the Ports of Entry above-mentioned, or any Justice of the Peace, Police Officer, or owner of land over which such animals may pass or may be passing.

ANNEXURE "A."

I.................................... do hereby certify that the animals herein specified (horse, gelding, mare, colt, filly, donkey, mule, bull, ox, cow, heifer, calf, or ostrich) are free from infectious or contagious disease, and have not been in contact with infected animals, and to the best of my knowledge and belief have not come from or through a locality where any such disease is known to exist, viz.:—

Number and general description..
Place from which sent................
Owner's Name and Address........

Name of Person in charge ....
Place in the Orange River Colony to which animals are sent...................................
Signature of Resident Magistrate, Justice of the Peace, Field cornet, Veterinary Surgeon or Inspector of Sheep of the District in the Cape Colony from which such animals have come..
Place...
Date..

PIGS (COLONIAL AND IMPORTED).

The introduction of Colonial-bred Pigs into the Orange River Colony from Cape Colony is regulated by Government Notice No. 7 of 10th July, 1905. Pigs imported into Cape Colony by sea, may be introduced into the Orange River Colony, provided that—

(a) Such Pigs are conveyed direct from the port of landing to the Orange River Colony in closed trucks, such trucks having been properly disinfected at the port of landing; and

(b) A certificate, signed by a qualified Veterinary Surgeon at the Port of landing that such Pigs were landed free from disease, and that the trucks in which they are conveyed were properly disinfected, accompanies each consignment and is produced at the Border Station.

SHEEP AND GOATS.

The removal of sheep and goats will be allowed only under the Cape Colony Scab Acts Regulations.

Codling Moth Prohibition.

The following Proclamation, No. 354 of 1905, was issued by His Excellency the Governor:—

Whereas there is reason to believe that the portion of this Colony lying East, and including the districts of Albert, Molteno, Tarka, Bedford, Albany, and Alexandria, is free from the insect pest known as Codling Moth (*Carpocapsa pomonella*): and whereas it is expedient that the said area shall be protected against the introduction of the said pest: Now, therefore, under and by virtue of the powers and authorities vested in me by the 12th Section of Act No. 29 of 1905, entitled the "Nurseries Inspection and

Quarantine Act, 1905," I do hereby proclaim, declare and make known that, anything to the contrary in any previous Proclamation notwithstanding, from and after the date of this Proclamation the Regulations set forth in the Schedule hereto shall be the Regulations for the prevention of the spread to the said area of the insect known as "Codling Moth."

Schedule.

1. The introduction, by land or sea, into that portion of this Colony lying East of and including the Districts of Albert, Molteno, Tarka, Bedford, Albany, and Alexandria, by any means and for any purpose whatsoever of apple, pear, or quince fruits in their fresh state or of receptacles in which any such fruit has been carried, is hereby absolutely prohibited. This prohibition, however, shall not affect the transport by rail of any such fruit or receptacle which passes into the defined area in transit to points beyond.

2. Any such fruit or receptacle introduced into the said area in contravention of the foregoing Regulation shall be liable to confiscation and destruction.

Destruction of Locusts.

It is hereby notified for general information that Government aid will be granted towards poisoning or spraying of Locusts, subject to the conditions specified in the subjoined Schedule·

D. HUTCHEON,
Acting Director of Agriculture.

CONDITIONS OF GOVERNMENT AID.

Locust Boards.

1. The Resident Magistrate of the District will nominate a Locust Board, to consist of three persons for each Field-cornetcy, Municipality or Village Management Area.

2. The duty of the Board is to arrange where pumps are to be used and to receive and determine upon applications for soap, etc., and to issue orders for the same, signed by the Chairman.

Spraying Materials.

2. Government aid will be given in respect of the following articles:—

Blue Mottled Soap
Sunlight Soap.
Other cheap Soaps.
Arsenite of Soda.
(5) Spraying Pumps.

4. Directions for using soap spray and arsenite of soda– sugar spray are set forth in a leaflet, which can be obtained from the Locust Board.

Soaps.

5. Government will bear two-third of the costs of soaps purchased by applicants on orders signed by the Chairman of a Locust Board.

6. The cost of the soap must be the ruling market rate.

7. Storekeepers supplying soaps on orders of Locust Boards must render to the Resident Magistrate of the District their account for two-thirds of the cost, and to applicants direct their account for the remaining one-third cost. To the account rendered to the Resident Magistrate must be attached the order, which should bear the applicant's receipt for the soap.

Arsenite of Soda.

8. Arsenite of Soda will be issued by the Resident Magistrate free of charge to applicants in their own vessels in quantities of 10 lbs, on production of orders signed by the Chairman of the Locust Board. This will not, however, interfere with the discretion of the Magistrate, should he consider it necessary to issue arsenite without such an order.

Pumps.

9. The use of spraying pumps can be procured on application to the Locust Board for such period as the Board may allow.

THE PRODUCE MARKET

CAPE TOWN.

Mr. R. Müller supplies the following report for the month ending the 20th instant:

Ostrich Feathers.—The market is steady. Supplies are somewhat restricted. Parcels coming forward, shewing average to good quality are well competed for at full prices. Any pluckings of superior quality, especially wing goods, are eagerly enquired for.

	£	s.	d.	£	s.	d.
Super Primes	10	10	0	35	0	0
Firsts, Ordinary to Super ..	8	0	0	10	10	0
Seconds ..	6	0	0	8	0	0
Thirds ..	3	10	0	5	0	0
Femina (super)	7	0	0	10	0	0
Femina, Seconds to Firsts ..	4	0	0	6	10	0
Byocks (fancy) ..	5	0	0	7	10	0
Long Blacks ..	4	10	0	7	10	0
Medium Blacks	3	0	0	3	10	0
Short to Medium	0	10	0	2	10	0

	£	s.	d.	£	s.	d.
Floss ..	0	5	0	1	10	0
Long Drabs ..	2	10	0	4	10	0
Medium Drabs ..	1	5	0	1	15	0
Short to Medium	0	10	0	1	10	0
Floss ..	0	2	6	1	10	0
White Tails ..	1	5	0	1	15	0
Coloured Tails ..	0	5	0	1	10	0
Chicks ..	0	1	0	0	2	0
Spadones ..	2	10	0	4	0	0
Inferior Black & Drabs, Short to Long ..	0	0	6	1	10	0

Wool.—A considerable quantity of wool has been offered during the past month. Grassvelds were a special feature in the catalogues. Some nice parcels from the Darling, Swellendam, and Caledon districts have been offered, and realised good prices. Calvinia Grease Medium realised from 6d. to 6¼d., Long from 6½d. to 7d., Karoos from 6½d. to 7½d. for Medium to Long, Malmesburys from 6½d. to 7¼d. for ordinary to good, and up to 8½d for Superior. Bokveld and Roggevelds brought up to 9¼d. for Superior Clips, while Caledon and Swellendam parcels of fair to good quality realised from 9d. to 9¾d Superior Snow Whites up to 1s. 9d., Ordinary 1s. 5d. to 1s. 7d. Seconds 1s. 1d. to 1s. 4d.

	s.	d.	s.	d.
Super Long Grass Veld Wool	0	8	0	10
Super Long Karoo Veld Wool	0	6¾	0	8
Medium Karoo Veld Wool	0	5	0	6¼

	s.	d.	s.	d.
Short and Inferior ..	0	4	0	5¼
Wool for Washing ..	0	4½	0	6½
Snow-white Super to Extra	1	7	1	10½
,, Ordinary	1	2	1	7
Fleece Washed ..	0	9	0	10

Mohair.—The London sales held on the 8th of November were rather disappointing, when out of 2,200 Bales offered, only about 1,000 were sold. Kids and Firsts of Summer description did not receive much enquiry, 19½d. and 16d. respectively were the prices offered for these. Winter description was dull. In consequence of this news, business on this side is somewhat restricted.

	s.	d.	s.	d.
Mohair, Firsts, Summer	1	0	1	3
,, Kids.. ..	1	3	1	6
,, Seconds ..	0	6½	0	9½

	s.	d.	s.	d.
Mohair Winter ..	0	10	1	0
,, ,, Kids..	1	0	1	3

Skins and Hides.—At the London sales held on the 2nd November Goat Skins were in strong demand at ½d. to 1d. advance for all light descriptions. Heavy weights showed a lower tendency. All other skins are in good demand locally at full rates.

PORT ELIZABETH.

Messrs. John Daverin and Co., report under date, November 17th, 1905:—

Ostrich Feathers.—There is no new feature to report in the market this week, it was supplied with the usual average assortment, competition was general and there was no quotable change in prices. Stocks and new arrivals are very moderate. The total value of feathers sold on the public market this week amounted to £7,040 11s. 2d. and weighed 3,872 lbs. 13 ozs.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Primes : Extra super				Special Prices.			Blacks : Long	3	0	0	4	10	0
Good to super	9	0	0	13	0	0	Medium	1	5	0	2	10	0
Whites : Firsts	7	0	0	9	0	0	Short	0	10	0	0	15	0
Seconds	4	10	0	5	0	0	Wirey	0	1	0	0	1	6
Thirds	2	10	0	4	0	0	Floss	0	6	0	1	5	0
Feminas : Tipped							Drabs : Long	1	10	0	2	10	0
and Grey	5	0	0	8	0	0	Medium	0	12	6	1	5	0
Seconds	3	0	0	4	10	0	Short	0	2	6	0	6	0
Thirds	2	0	0	3	0	0	Wirey	0	0	6	0	1	0
Fancy	4	10	0	6	10	0	Floss	0	6	0	1	5	0
Tails : White	1	5	0	2	10	0	Spadonas : Light	2	0	0	3	10	0
Light	0	17	6	1	5		Dark	0	12	6	1	12	6
Coloured & Dark	0	5	0	0	12	6	Chicks	0	0	3	0	1	6

Wool.—A strong demand continues for all light conditioned lots, and a fair amount of business has been done in the open market during the week at current rates. Heavy, greasy, and wasty clips are neglected and in order to effect sales of this description low prices have to be accepted. Buyers are paying special attention this season to the condition of the wool offered to them, because last season there were many serious disappointments in the matter of shrinkage in washing. We regret that some of the wool coming forward now is not in as good condition as wools coming from the same districts in the early part of the season. This we attribute to the effects of drought, and applies to the northern districts of the Cape Colony, and the O.R. Colony. This cause of detriment to the condition and consequent value of the wool is, we are pleased to think, now removed, through the fine rains just reported to have fallen over these particular parts of the country. We repeat what we have so often said in these weekly reports, that the first essential in a clip of wool in order to secure a high price is good condition ; that is, freedom from excessive grease and sand, and being carefully locked and skirted ; good quality and length of staple are also necessary ; but neither length and soundness of staple, nor fineness of quality, will secure a high price, if the wool is very greasy and sandy and faulty through the presence of burr, carrot seed or other vegetable matter.

Snowwhite Extra Superior ..	20d	20½d
Snowwhite Superior ..	17½d	19d
Do Good to Superior	16½d	17d
Do Inferior Faulty	15½d	16d
Grease, Super Long, well-conditioned, Grassveld grown (special clips)	8d	9d
Grease, Super Long, well-conditioned, Grassveld grown ..	7d	8d
Grease, Super Long, well-conditioned, Karoo grown (special clips)	7½d	8¼d
Grease, Super Long, well-conditioned Karoo grown ..	6¾d	7½d
Grease, Super Long, well-conditioned, Mixed Veld ..	6¾d	7¼d
Grease, Light, faultless, medium, Grassveld grown.. ..	6d	6¾d
Grease, Light, faultless, medium Karoo grown	6d	6½d

Grease, Light, faultless short Karoo grown	5¾d	6¼d
Grease, Short, faulty and wasty ..	4¾d	5¼d
Grease, Coarse and Coloured ..	5¼d	5½d
Scoured, Coarse and Coloured ..	6½d	10½d
O. R. C. Grassveld Grease, long and well-conditioned (special clips) ..	7d	8d
O. R. C. Grassveld Grease, long and well-conditioned ..	6¾d	7¼d
O.R.C. medium grown, light, with little fault	6d	6½d
O.R.C. short, faulty and wasty ..	4¾d	5¼d
O.R.C. Karoo grown, long and well-conditioned ..	6d	6¼d
O.R.C. medium grown, light, with little fault	5½d	6d
O.R.C. short, faulty and wasty ..	4¾d	5d

Mohair.—As mentioned in our last week's report, the public sale held in London on the 8th inst. was disappointing, the highest prices, made only for a few super lots out of some 1,200 bales sold, was 16d. for Firsts and 19½d. for Kids, equal to 14½d. and 18d. respectively on this market. We may remark that we sold *here* during the past few months some thousands of bales of Firsts and Kids at 15d. for the former and 18d. for the latter, and for some fine long Firsts, from O.R. Colony, we got as high as 15½d.; from this it is evident that this is the best market for the disposal of mohair, and the same applies to wool when both are placed into the hands of capable and experienced agents. Our London correspondents, writing under date 27th and 28th October, refer to mohair in the following terms: "The trade is exceedingly healthy, and everything points in the direction of a steady demand for some months to come; machinery is fully employed. From what we can learn, there appears to be a demand for fancy mohair dress goods, and imitation fur trimmings promise to be fashionable, and for this trade chiefly Winter Hair and Mixed Capes will be required." They continue: "Turkey Fair average is not in as good demand as Cape Firsts, and whilst the latter are quoted at 16d. and 16½d. rett, Turkey Fair average can be bought at 16d., less 5 per cent., equal to 15½d. nett. Summer Kids are in very limited demand; Summer Firsts are wanted, but Turkey hair being comparatively cheaper, anything above 16d. per lb. is very difficult to obtain. Mixed and inferior sorts, blues, etc., are in strong demand, and likely to continue so. Winter Hair is asked for, and. generally speaking, the situation is healthy. The fresh complications in Russia, with the consequent interruption of trade, have been a disappointment to spinners, but otherwise the trade is of such a volume as to keep prices fully firm." Practically nothing has been done locally during the past fortnight and consequently stocks, chiefly of Winter Hair, have accumulated to some 3,000 bales. The present is but a temporary lull, and we look forward to an active demand at recent prices or better before very long.

Superior Firsts special clips	15d
Ordinary Firsts ..	14d to 14½d
Long Blue O.R C. Hair	14½d to 15d
Super Kids ..	18d
Ordinary Kids ..	16d to 17d

Mixed Hair	0s	11d	0s	12d
Seconds and Grey	0s	8½d	0s	9½d
Thirds ..	0s	6d	0s	6d
Winter ..	0s	12d	0s	12½d
Do. Kids	0s	15d	0s	15d

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c. are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town.

Agricultural Miscellanea, price 6d. each. Extracts from Vols. I. to V. of *Agricultural Journal.*

Stock Farming; Artificial Grasses and Fodder for Stock; Ensilage; Dairying; Treatment of Cereal and other Crops; Viticulture and Wine Making; Forestry; Locusts and their Destruction; Possible New Industries for Cape Farmers.

Agriculture.

Wheat Production in Australia (1s. 6d.) by A. C. Macdonald; *Wheat Production in Australia (1s. 6d.) by W. Halse and J. D. J. Visser; Hop Cultivation (3d.) translated by A. W. Heywood; *Agricultural Weather Forecasts (1d.); *Brak Land in Relation to Irrigation and Drainage (1d.); *Poultry Raising (1d.); The Velvet Bean (1d.); Potato Disease (1d.): Scheme of Manurial Experiments (1d.); Leguminous Forage Crops for Trial in Cape Colony (1d.); Grasses for Trial in Cape Colony (1d.); Sundry Forage Crops for trial in Cape Colony (1d); Poultry in South Africa: Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d.); The Salt Bushes (1d.)

Dairying.

Dairy Breeds by A. C. Macdonald (9d); *Dairy Industry in Great Britain by A. C. Macdonald (6d.); †Dairy and its Products by D. Hutcheon (2d); *Dairy Industry in Denmark (2d); Ready Reckoner for Cream Testing (1s.); †Butter and Cheddar Cheese Making (1d.)

Entomology.

The Bont Tick (1d.); Bean Bruchus 1d.; Cabbage Aphis (1d.); Codling Moth in Madeira Fruit (1d); *Codling Moth (1d); Citrus Psylla (1d.); Fruit Fly (1d.); Fumigation Supplies (1d.); *Cyanide Gas Remedy for Scale Insects (3d); †Hessian Fly (1d.); Insect Friends and Foes (1d.); Methods of Locust Destruction (1d); *Peach Yellows (1d); Pear Slug, Paris Green (1d); Remedy for Mestwurmen (1d.) *Spray Calendar (1d.); *Spray Pump Notes (1d.): Scale Insects on Ornamental Trees and Plants (1d.); Two Pine Apple Pests (1d.); Tree Fumigation in California (1d.); Winter Spraying (1d.); Wattle Bag Worm (1d.); Bordeaux Mixture (1d.); Deaths Head Moth Superstition (1d); Fumigation under Box Covers (1d.); The House Fly (1d.); Revised Plant Import Regulations (1d.); New Oak Tree Pest (1d): Nursery Inspection and Quarantine Bill (1d.); Oil Water Pumps (1d.); The Plague of Ticks (1d); Potato Tuber Moth (1d.); Treatment of Buildings with Hydrocyanic Acid Gas for Destruction of Vermin (1d.); The Codling Moth; Notes on its Life Cycle and Remedies (1d); Gall Worms in the Roots of Plants (1d); The Fruit Fly,* (with coloured plates) (3d.); *Gas Treatment for Scale Insects (3d.); Another Introduced Scale Pest (1d); Washes for Red Scale (1d.); Fruit Fly: Peach Fly (1d.); Lime-Sulphur-Salt Wash for Scale Insect (1d.); Cyanide Gas Fumigation (1d.); The Fruit Moth 1d.); Fusicladium of the Apple and Pear (1d.); Mealie Stalk Borer (3d.)—*coloured plate*; Cleaning up Nursery (1d.); Natural Enemies of the Fruit Fly: Report on Investigations in Brazil (1d)

Forestry.

British National Forestry (1d); Botanical Observations on Forests in Eastern Pondoland (1d.); Elementary Principles of Sylviculture or Woodcraft (1d.) National Forests (1d.); Tree Planting (5d.); *Tree Planting for Farmers (1d.); Indigenous Timbers of the Cape (1d); Misuse of Coal and the Uses of Forests (1d); Tree Planting for Timber and Fuel (1d.)

Note.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

Fisheries.

Trout and Carp Breeding and Stocking of Streams (1d.); *Methods of Preserving Fish by Smoking (1d.); Portable Floating Hatching Box for Trout Ova (1d.)

Horticulture.

Fruit Culture in the Gamtoos River Valley (1d.); *Marketing of Fruit (1d.); Manual of Practical Orchard Work at the Cape (6d.); The Olive at the Cape (2d); Tomatoes and Fruit for Export (1d.); Citrus Culture in Cape Colony: Report of the Citrus Commission (1d.); *Fruit from Orchard to Buyer (1d); Netting for Fruit Trees (1d.); Fruit Culture in Argentina (1d.)

Veterinary and Animal Industry.

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d.); Horse Sickness (2d.); * Heartwater (1d); * Liver Disease among Calves (3d.); Lungsickness of Cattle (1d.); * Malarial Catarrhal Fever of Sheep (1d.); * Preventive Vaccination against Anthrax and Swine Fever (1d.); Rinderpest: Dr. Koch's Report (1d.); *Inoculation against Rinderpest (1d); Dr. Kohlstocks Report on Inoculation for Rinderpest (1d.); *Redwater, Texas Fever or Tick Disease (1d.); *Redwater, Anthrax and Quarter Evil (1d.); † Scab and its Nature (3d.); *Sheep and Wool (1d.); Treatment for Worms in Domestic Animals (1d.); †International Conference of Sheep Breeders (1d.); The Eye and its Diseases (1d.): Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.); Tick Heartwater Experiments (1d.); Indigestion and Diarrhœa in Calves (1d.); Persian Sheep and Heartwater (1d); Poisoning of Stock (1d.); Retention of the Fœtal Membrane, or Afterbirth in Cows (1d); Stijfziekte, Lamziekte or Osteo-Malacia and Paralysis (1d.); Transmission of African Coast Fever (3d.): Tuberculosis and the Use of Tuberculin (1d.); African Coast Fever with Description of Dipping Tank (3d.); Notes on the so-called Paralysis Tick (1d): *Rinderpest in South Africa (3d) by D. Hutcheon; *Fluke or Slak in Liver of Sheep (3d.)—*coloured plate*; *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d.); Osteo Porosis (3d.) —*coloured plates*; *Glanders (3d) – *coloured plate*; *Animal Castration (1d.); *Preventive Inoculation for Redwater (1d.); * Abortion in Cattle (1d.); Treatment for Worms in Domestic Animals (1d.)

Viticulture.

†Reports on Viticulture (3d.); *Reconstitution of Phylloxerised Vineyards (1s.); Report on Failure of Hanepoot Grapes on American Vines (1d); The Making of Wine and its By-Products (6d.); How to Treat Wine Casks (1d.); Failure of Vines (1d.)

Miscellaneous.

Game Seasons (3d.); Land Laws of Cape Colony (1d.): *Monsonia: the Cape Cure for Dysentery (1d.); *Rainfall of South Africa (1d.); Sand Dunes of Gascony (5d.); The Metric System (1d.); South African Stud Book, Constitution, Rules, &c.; Transvaal Plant Import Regulations (1d.)

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